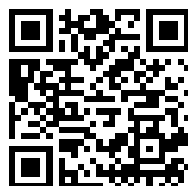

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EASTERN ARCHIPELAGO
PILOT
VOL.III

INCLUDING THE
NORTH-EASTERN END OF CELEBES,
MOLUCCA, CERAM, BANDA AND
ARAFURA SEAS, AND THE WESTERN
END AND SOUTHERN COAST OF
NETHERLANDS NEW GUINEA.

FOURTH EDITION

1943

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the port and of anchoring positions in which they shall anchor. If Government vessels, or vessels belonging to the local port authority, are found patrolling in the offing, merchant vessels are advised to communicate with such vessels with a view to obtaining information as to the course on which they should approach the port. Such communication will not be necessary in cases where the pilot on board has already received this information from the local authorities.

(6) As the institution of the Examination Service will probably be unknown to vessels desiring to enter the port, especial care should be taken in approaching the ports, by day or night, to keep a sharp lookout for any vessel carrying the flags or lights mentioned in paragraph (7), and to be ready to "bring to" at once when hailed by her or warned by the firing of a gun or sound rocket.

In approaching by night any port in the British Empire, serious delay and risk will be avoided if four efficient all round lanterns, two *red* and two *white*, are kept available for use.

(7) By day the distinguishing flag of the Examination vessel will be a special flag (white and red horizontal surrounded by a blue border).

Also, three *red* balls vertically disposed if entrance is prohibited.

Usually the Examination vessel will fly the blue ensign, but in certain circumstances she may fly the white ensign.

By night the steamer will carry: (a) Three *red* lights vertically disposed if entrance is prohibited; (b) three *white* lights vertically disposed if entrance is permitted.

The above lights will be carried in addition to the ordinary navigation lights, and will show an unbroken light around the horizon.

(8) Merchant vessels approaching a British port, at which the Examination Service is in force, must hoist their signal letters on arriving within visual signalling distance of the port and are not to wait for the signal "What is the name of your vessel?" to be made from the Examination vessel.

(9) Masters are warned that, before attempting to enter any port when the Examination Service is in force, they must in their own interests strictly obey all instructions given to them by the Examination vessel.

Whilst at anchor in the Examination Anchorage, Masters are warned that it is forbidden, except for the purpose of avoiding accident, to do any of the following things, without permission from the Examination Officer:—(a) To lower any boat; (b) to communicate with the shore or other ships; (c) to move the ship; (d) to work cables; (e) to allow any person or thing to leave the ship.

(10) In case of fog, Masters of vessels are enjoined to use the utmost care, and the port should be approached with caution.

(11) When the Examination Service is in force, merchant vessels when approaching ports are especially cautioned against making use of private signals of any description, either by day or night; the use of them will render a vessel liable to be fired on.

(12) The pilots attached to the ports will be acquainted with the regulations to be followed.

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**NOTATIONS OF SUPPLEMENTS AND ANNUAL
SUMMARIES OF NOTICES TO MARINERS
RELATING TO THIS BOOK.**

To be filled in by Navigating Officer.

(In Chart Depôts the first two columns are alone to be filled up.)

Title.	Date of Publication and Number.	Whether pasted in or noted in Margins of Book, and Date of each Correction.

CAUTION.

**Attention is called to British Admiralty Notices to Mariners
Nos. 1, 4 and 7, which are published annually.**

NOTICE.

This volume should not be used without reference to the latest Supplement and Annual Summary of Notices to Mariners affecting it which may have been published.

A Supplement to this volume will generally be published annually until the latter is again taken up for revision.

After the publication of Supplement No. 1, each succeeding supplement cancels the former.

Between the time of the volume being taken up for revision and the publication of the new edition no supplement will be issued, but early in each year a Summary of the Admiralty Notices to Mariners affecting the volume, which have been published during the preceding year, will be issued as a separate publication.

The publication of all Supplements and Summaries of Notices to Mariners is announced in Admiralty Notices to Mariners.

The latest Supplement and any Annual Summary of Notices to Mariners that has been published affecting this volume will be obtainable gratuitously by purchasers of this volume from the Agents for the sale of Admiralty charts and other Hydrographic publications, on application either personally or by letter; in the latter case the cost of postage must be enclosed. For a list of these Agents *see* Admiralty Notice to Mariners No. 2, published annually.

Gt. Brit. Hydrographic Office.

Eastern Archipelago Pilot

VOLUME III

INCLUDING THE
NORTH-EASTERN END OF CELEBES,
MOLUCCA, CERAM, BANDA AND
ARAFURA SEAS, AND THE WESTERN
END AND SOUTHERN COAST OF
NETHERLANDS NEW GUINEA

FOURTH EDITION, 1943

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CAUTION.

IN THIS WORK THE BEARINGS ARE ALL TRUE, AND
WHEN GIVEN IN DEGREES ARE RECKONED
CLOCKWISE, FROM 000° (NORTH) TO 359°.

THE BEARINGS OF LIGHTS ARE GIVEN FROM SEAWARD.

THE LATITUDES AND LONGITUDES GIVEN IN THE
TEXT ARE APPROXIMATE.

THE DISTANCES ARE EXPRESSED IN NAUTICAL MILES
OF 60 TO A DEGREE OF LATITUDE.

A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO
THE TENTH PART OF A NAUTICAL MILE.

THE DEPTHS ARE GIVEN BELOW CHART DATUM LEVEL
WHERE NOT OTHERWISE STATED.

HEIGHTS ON THE LAND ARE GIVEN ABOVE MEAN
LEVEL OF HIGH WATER SPRING TIDES.

FIGURES IN BRACKETS GIVEN AFTER THOSE
DENOTING FEET, FATHOMS AND YARDS ARE
THEIR EQUIVALENTS IN METRES.

TIME IS EXPRESSED IN THE FOUR-FIGURE NOTATION
COMMENCING AT MIDNIGHT.

THE TERM "STEAM VESSEL" USED HEREIN IN-
CLUDES ANY VESSEL PROPELLED BY MACHINERY.

A NAME IN BRACKETS, IMMEDIATELY FOLLOWING
ANOTHER NAME, IS THE OBSOLETE NAME WHICH IS
STILL SHOWN ON THE ADMIRALTY CHARTS. AS A
GENERAL RULE, THE BRACKETED NAME IS ONLY
INSERTED IN THE DESCRIPTION OF THE PLACE OR
OBJECT PREVIOUSLY BEARING THAT NAME.

WHEN SHADING IS USED TO INDICATE COLOURS OF
FLAGS, TIDAL LIGHT SIGNALS, OR
BEACONS, IT IS AS FOLLOWS:



Yellow.



Red.



Blue.



Green.



Black.

ADVERTISEMENT

Eastern Archipelago Pilot, Vol. III, contains a description of the south-eastern part of the Archipelago, including the north-eastern end of Celebes, the Molucca, Ceram, Banda and Arafura seas, and the western end and southern coast of Netherlands New Guinea.

The area described in this volume was formerly included in the Eastern Archipelago Part I, published in 1890, and was first published as a separate volume, Vol. III, in 1911, the second edition being published in 1921, and the third edition in 1930.

This, the fourth edition, prepared by Captain F. M. Hodgson, R.N., contains the latest information from the Dutch publications.

The meteorological information has been revised by the Meteorological Office of the Air Ministry. Temperature is expressed in degrees Fahrenheit, rainfall in inches, and speed in knots and distance in nautical miles unless expressly stated otherwise. Information received from meteorological services which do not use these units has been converted into the units mentioned above by the Meteorological Office.

Mariners and others are invited in the interests of navigation to forward to the Hydrographer of the Navy, Admiralty, London, S.W.1, any information that may come under their notice, which would be useful for the correction of the charts and other hydrographic publications issued by the British Admiralty; *early* advice as to newly-discovered dangers, the establishment of, or changes in, any aids to navigation, is specially requested.

Copies of a form (H. 102) on which to render information can be obtained gratis from the Hydrographer of the Navy, Admiralty, London, S.W.1; or any of the agents in Great Britain and abroad, a list of whom is published, annually, in Admiralty Notice to Mariners No. 2.

By the publication of this volume the third edition of the Eastern Archipelago Pilot, Vol. III, 1930, and its Supplement, No. 10, 1942, are cancelled, and all information affecting that work contained in Notices to Mariners up to and including No. 239 of 1943, has been embodied in this volume; for Temporary and Preliminary Notices to Mariners affecting this edition, the list of Temporary and Preliminary Notices to Mariners in force, published monthly in the weekly edition of the Admiralty Notices to Mariners, should be consulted.

J. A. EDGELL,
Vice-Admiral,
Hydrographer of the Navy.

*Hydrographic Department,
Admiralty, London,
30th January, 1943.*

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with Supplement No. 1, 1939, thereto.

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Lichtenlijst van Nederlandsch-Indië, 1936.

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GLOSSARY OF WORDS OCCASIONALLY FOUND ON THE CHARTS AND SAILING DIRECTIONS

Malay.	English.	Malay.	English.
Ayer . . .	Water	Mios (New Guinea)	Island
Barat . . .	West	Muara . . .	Mouth of a river
Batu . . .	Rock, stone	Napo, or Naponapo	Reef
Besar . . .	Large, great	(on N.C. Celebes)	Small marsh palm
Beting . . .	Shoal, sand	Nipa . . .	Island
Bukit . . .	Hill	Nuhu (Kai eilan-	Island
Chi . . .	River	den) . . .	Island
Dalam or Dalem .	Deep	Nusa . . .	Island
Darat . . .	Coast, land	Panjang . . .	Long
Gili . . .	Island, rock	Pantei, Pingir Laut	Coast, seaboard
Gunong . . .	Mountain	Pasi . . .	Bank, shoal, or
Gusong . . .	Reef of rocks	Pasir . . .	reef, which dries
Itam . . .	Black	Pelabuan . . .	Bank, shoal or
Jalan . . .	Road	Pulau . . .	reef, which
Jambatan . . .	Mole, jetty	Putih . . .	dries, conspicu-
Kaler . . .	North	Salatan . . .	ous sandy beach
Kali . . .	River	Sari . . .	Anchorage
Kampong . . .	Village	Selat . . .	Island
Karang . . .	Coral reef	Sungei . . .	White
Kawala . . .	Mouth of a river	Tanjong . . .	South
Kechil . . .	Little, small	Telok . . .	Reef
Kidul . . .	South	Timur . . .	Channel, strait
Kota . . .	Town	Trusan . . .	River
Kulon . . .	West	Tuwak . . .	Cape, point
Labuan . . .	Anchorage	Wai . . .	Bay
Lama . . .	Old	Wetan . . .	East
Laut . . .	Sea		
Lor . . .	North		
Lumpur . . .	Mud		
Netherlands.	English.	Netherlands.	English.
Archipel . . .	Archipelago	Nieuw . . .	New
Baai, bocht . . .	Bay	Noord . . .	North
Eiland . . .	Island	Oost . . .	East
Eilandje . . .	Islet	Oud . . .	Old
Gebergte . . .	Range of mountains	Reede . . .	Roadstead
Golf . . .	Gulf	Rif . . .	Reef
Groot, groote . . .	Great	Rivier . . .	River
Hock, kaap . . .	Cape, point	Straat . . .	Strait
Klein, kleine . . .	Little	Vlakte . . .	Plain
Kreek . . .	Creek	Vulkaan . . .	Volcano
Meer . . .	Lake	Wert . . .	West
		Zuid . . .	South

SYSTEM OF ORTHOGRAPHY

The following rules for the spelling of geographical names (termed the R.G.S. II system) have been adopted for British official use, and the names in Admiralty Hydrographic publications will be rendered in accordance with these rules as opportunity occurs.

In new editions of the various volumes of sailing directions names are, generally speaking, given in accordance with these rules, but where the name on the chart shows an older rendering of a name, such chart name is given in brackets after the new rendering and will also be given in the index.

The rules for spelling in the R.G.S. II system are as follows :—

- (1) The spelling of every place-name in an independent country or self-governing dominion using the Roman alphabet (including "Roman" alphabets containing extra or modified letters, such as Czech, Serb-Croat, Polish, Romanian, etc.) shall be that adopted by the country or dominion.
- (2) In colonial possessions the spelling of such place-names as belong to languages coming under rule (1) will be spelt in accordance with that rule.
- (3) The accents and diacritical marks in official use by the above countries will be retained. Wherever it appears desirable, the pronunciation will be shown by giving the name as transliterated on the system below.
- (4) All other place-names throughout the world will be spelled in general accordance with the following system.

The broad features of this system are—

- (a) That vowels are pronounced as in Italian and consonants as in English :
- (b) That every letter is pronounced, and no redundant letters are used.

This system aims at giving a close approximation to the *local* pronunciation ; but it is recognised that in some languages, notably Russian, Greek, and Arabic, the necessity for letter-for-letter transliteration often renders this impossible.

TABLE OF SPELLING AND PRONUNCIATION R.G.S. II.

a	The long and short Italian vowels, as in <i>lāvā</i> ..	Somālī; Rāvennā.*
ā	Between a in <i>fat</i> and e in <i>eh</i> ? ; chiefly in Teutonic and Finno-Ugrian languages	Mähring; Pärnu.
ai	The two Italian vowels, frequently diphthongal, as in <i>aisle</i> ; but pronounced ā in Greek names ..	Wadai; Shanghai.
au	The two Italian vowels; frequently diphthongal; almost as <i>ou</i> in <i>out</i>	Sakan; Bauchi.
aw	When followed by a consonant, or when terminal, as in <i>awl</i> , <i>law</i>	Dawna; Saginaw.
b	As in English.	
c	Not to be used, but always replaced by <i>k</i> or <i>s</i> ; except in the compound <i>ch</i> , and in many conventionally-spelt words, as	Kandahar; Serang. Calcutta; Célèbes.
ch	As in <i>church</i> ; never <i>tch</i> or <i>tsch</i> for this sound ..	Chad; Kerch.
d†	As in English.	
dh	Soft <i>th</i> as in <i>they</i> ; a slight <i>d</i> sound sometimes preceding it in Semitic languages	Hadhramaut; Riyadh.
e	Long as in <i>eh</i> ? short as in <i>bet</i> . (For the <i>e</i> sound in the French <i>je</i> , see note at end on the "neutral vowel.")	Gēlo; Mafeking.*
(ee)	Used for <i>i</i> (<i>q.v.</i>) only in a few conventional names	Darjeeling; Keelung.
ei	The two Italian vowels, frequently diphthongal as in <i>rein</i> , but pronounced <i>i</i> in Greek names ..	Beirut; Raheita.
(eu)	Not used as a single sound.	
f	As in English; <i>ph</i> must not be used for this sound	Mustafa; Maidan-i-Naftun.
g	Hard, as in <i>get</i> , <i>gift</i> : never as in <i>gem</i> , <i>gin</i> ..	Gedāref; Gilgit.
gh	Soft guttural, the Arabic <i>ghain</i>	Ghadames; Baghdad.
h	Used only when sounded; or in the compounds <i>ch</i> , <i>dh</i> , <i>gh</i> , <i>hh</i> , <i>sh</i> , <i>th</i> , <i>zh</i>	Ahmadabad; Abdullah.
i	Long as in <i>marine</i> ; short as in <i>piano</i>	Fiji; Kibonde.
j	As in English; except in transcription of Chinese, where it equals <i>zh</i> , or the French <i>j</i>	Juba, Ujiji (Eng. <i>j</i>); but Jaoping (Fr. <i>j</i>).
k	As in English; hard <i>c</i> should never be used (except in conventionally-spelt words)—thus, not <i>Corea</i> , <i>Cabul</i> , but	Korea; Kabul.
kh	Hard aspirated guttural, as in the Scottish <i>loch</i> (not as in <i>lock</i>)	Khan; Sebkha.
l† m n†	As in English.	

*The long and short symbols given here are merely for explanation, not for use.

†See note at end on *Liquid Sounds*.

- ng** Has three separate sounds, as in *vanguard*, *finger*, and *singer*. If necessary to distinguish, a hyphen may be placed, as in *van-guard*, *singer*... .. In-galla; Bongo; Ng-ami; Tong-a.
- ngg** May be used for the sound of *ng* as in *finger* .. Trengganu; Yanggang-a.
- o** Long as in *both*¶: short as in *rotund* Kigōma; Hōnōlulu.*
- ō** As in German; equals the French *eu* in *peu*; or nearly the English sound in *fur* Barkōl.
- (oo)** Used for *u* (*q.v.*) only in a few conventional names, chiefly Indian and Chinese Poona; Foochow.
- oi** The two Italian vowels; frequently diphthongal as in *oil*, but pronounced like *i* in *fit* in Greek names Hanoi.
- ōi** The diphthong as in French *oeil* and Norwegian *høi* Hōiland.
- ou** Dissyllabic, and not as French or English *ou*, except in Greek names where it has the French value Zlatoust; Yaroua.
- ow** Used as a diphthongal combination of *ō* and *ū* only in the romanisation of Chinese Hankow.
- p** As in English.
- ph** As in *loophole*; not to be used for the *f*-sound, except conventionally Chemulpho; Haiphong.
- q** Represents *only* the Arabic *qaf* and the Hebrew *qof*; i.e. a guttural *k* (as a rule) Qena; Qiryath.
- qu** Should never be employed to represent the sound of *kw*; thus, not Namaqua, Quorra, but Namakwa; Kworra.
- r** As in English; should be distinctly pronounced.
- s†** As English *ss* in *boss*, not as in *these* or *pleasure* Burgos; Masikesi.
- sch** As in *discharge* Ruschuk.
- sh** } As in English.
t† }
- th** Hard *th* as in *thick*, not as in *this* (except conventionally in Fijian) 'Athlith; Thingvellir.
- u** Long as in *rude*, or as *oo* in *boot*; short as in *pull* Zūlū; Rūanda.*
- ū** As in German: equals the French *u*, as in *tu* (Fr.) Ūskūdar.
- v** } As in English.
w }
x }
- y** Always a consonant, as in *yard*; it should not be used as a terminal vowel, *e* or *i* being substituted; e.g. not Kwaly or Wady, but Kikuyu; Maya. Kwale; Wadi.
- z** As in *gaze*, not as in *azure*.
- zh** As the *s* in *treasure*, the *z* in *azure*, or the French *j* in *je*; but for the sound in Chinese use *j* (*vide* note about under *j*) Zhob.

*The long and short symbols given here are merely for explanation, not for use.
†See note at end on *Liquid sounds*.

¶The true Italian *ō* is broader than this; almost as in *broth* (=R.G.S. II *aw*). The letter *o* is conventionally used for this sound in certain names in Nigeria, Tonga, etc.: e.g. Oyo, Fofoa.

NOTES.

The doubling of a vowel or a consonant is only necessary when there is a distinct repetition of the single sound, and should otherwise be avoided

Nuusafee; Moorea;
Jidda; Muhammad.

Accents should not generally be employed; but in order to indicate or emphasize the stress, an acute accent may be used

Saráwak; Qántara;
Tong-atábu; Paraná.

A long or short mark over a vowel (e.g. ā, ò) should only be used (and that sparingly) when without it there would be danger of mispronunciation ..

Kút; Kyōto; Abōso.

Hyphens will not be used except to indicate pronunciation and with the particle *-i-* (in Persian, Fijian, etc.)

Ta-if; Pusht-i-Kuh;
Nuku-i-Ra.

Inverted comma and apostrophe.—The inverted comma ' is employed only to represent the Arabic *'ain*, the Maltese *'ghain*, and the Hebrew *'ayin*. The apostrophe ' in foreign words indicates a liquid sound (*see* below).

Liquid sounds.—The occasional "liquid" or "palatalised" sound of *d*, *l*, *n*, *s*, *t*, etc. (as in *d'you*, *lure*, *hew*, *pursue*, etc.) is as a rule sufficiently represented by the following *y*; where, however, owing to a following consonant, or to the letter in question coming at the end of a word, the *y* is inapplicable, the liquid sound will be represented by an apostrophe, thus: *d'*, *l'*, *n'*, *s'*, *t'*, etc.

The "Neutral vowel."—The "indeterminate" or "neutral" vowel sound (*er*), i.e. the sound of *a* in *marine*, *e* in *often*, *i* in *stir*, *io* in *nation*, *o* in *connect*, *ou* in *curious*, *u* in *difficult*, etc., *e* in French *je*, or the often unwritten vowel (*Fat-ha*) in Arabic, etc., is represented as a rule by *a*: as in Basra, Hawiya; but sometimes by *e*, when the sound approximates more to *e* than to *a*; as Meshed, El Gezira.

The sound must not be confused with *e-mute*, where the *e* is not sounded at all as in Abbeville.

Nasal vowels.—In illustrating the pronunciation of French, Portuguese, Polish, etc., nasal vowels, the nasalisation will be represented by italic *n*; as Czeſtochowa pr. Chānstokhóva.

Note.—The Royal Geographical Society has published a book entitled "Alphabets of Foreign Languages transcribed into English according to the R.G.S. II system." This book enables the correct rendering of names to be obtained, also of names in languages which are transliterated letter for letter.

INFORMATION RELATING TO ADMIRALTY CHARTS AND PUBLICATIONS, AND GENERAL NAVIGATION.

ON THE CORRECTION OF ADMIRALTY CHARTS.

Guides to Navigation.—In addition to the charts, the navigational publications which are primarily affected by the continual changes and alterations that take place are the Admiralty Sailing Directions, the Admiralty List of Lights, Fog Signals and Visual Time Signals, and the Admiralty List of Radio Signals. The Admiralty Notices to Mariners contain information mainly for the correction of the charts and navigational publications. 5

CHARTS.

1. Degree of Reliance.—While the Admiralty charts can be relied upon to be correct for all information received, it should be clearly understood that the value of a chart depends on the character of the original survey and on the completeness of the reports of subsequent changes. The remarks on "The Use of Charts as Navigational Aids, &c.", which are subjoined should be carefully studied in this connection. 10 15

2. System of Dating and Issue of Corrected Copies.—Admiralty charts after first publication, are kept corrected by means of new editions, large corrections, and small corrections. Copies of charts issued by the Hydrographic Supplies Establishment, Admiralty Chart Agents or Admiralty Chart Dépôts are corrected, except from temporary and preliminary Notices to Mariners, for all navigational information to the date of issue. 20

New charts.—The date of publication of a chart is shown outside the bottom margin, in the middle, e.g. :— 25

Published at the Admiralty 30th May, 1938.

New Editions.—When a chart is revised throughout and modernised in style a new edition is published, the date being shown outside the bottom margin and to the right of the date of publication, e.g. :—

New Edition 2nd Jany., 1938. 30

All large and small corrections notations are at the same time erased, and all old copies of the charts are cancelled.

Large Corrections.—When a chart is corrected from important information which is too comprehensive to promulgate by Admiralty Notice to Mariners or to insert conveniently by hand on existing copies, but when the chart is not revised throughout, the date on which these corrections are made is shown on the chart outside the bottom margin and to the right of the date of publication, and in the case of a chart already marked with a new edition date, below such date, e.g. :— 35 40

Large corrections 10th Feb., 1938.

All small corrections notations are at the same time erased, and all copies of the chart are cancelled.

Small Corrections.—

- 5 (i) When a chart is corrected from the information promulgated in an Admiralty Notice to Mariners (except temporary and preliminary Notices), the year, if not already shown, and number of the notice are entered in the bottom left-hand corner of the chart, e.g. :—

Small corrections 1938-903.

- 10 Copies of the chart stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents and the Admiralty Chart Depôts are corrected by hand from such information.

- 15 (ii) When a chart is corrected from information which is considered of no importance from the standpoint of safe navigation, and which is, therefore, not promulgated in an Admiralty Notice to Mariners, the year, if not already shown, and date of the correction are entered on the chart, in one of two ways, in the bottom left-hand corner below the margin and in sequence with the notations referred to in the preceding paragraph, e.g. :—

*Small corrections, 1938—*5.20*—*

or Small corrections 1938—(VI.25)

- 25 These indicate that the chart received minor corrections on the 20th May or 25th June, respectively.

- 30 In such cases copies of the chart held by ships and establishments are not usually replaced by new copies, but in exceptional cases, e.g., when new compasses are inserted, new copies of the charts may be supplied. It should, however, be particularly noted that the absence of corrections represented by square or bracket dates from a chart does not invalidate it for navigation.

3. **Correction of Charts in Ships.**—All small but important corrections affecting navigation that can be made to the charts by hand are promulgated in Admiralty Notices to Mariners and, with the exception of corrections from temporary or preliminary Notices, should at once be neatly made in waterproof red ink on the charts affected, the year (if not already shown) and numbers of the notices being inserted, also in waterproof red ink, in the bottom left-hand corner of the chart. The recognised abbreviations shown on Admiralty chart No. 5011 ("Signs and abbreviations used on Admiralty Charts") should be used.

Generally speaking, the amount of information which should be inserted on a chart should be in accordance with that already shown.

- 45 *On large scale charts*, the abridged descriptions, as shown on chart No. 5011, of all details of all lights, light-buoys and fog signals, and the year dates of obstructions, reported shoals, dredged channels, depth on bars or in shifting channels, and irregularities of lights, should be inserted.

- 50 *On coastal charts*, the abridged descriptions of only the principal lights and fog-signals, i.e., those to assist in approaching or making the land, should be inserted.

Particulars of such lights should be omitted, in the following order, as the scale of the chart decreases, viz. :—

- (i) Elevation, (ii) Period, (iii), Number in Group, and (iv) Visibility.

Particulars of fog signals should be inserted in their appropriate positions if space permits, but should otherwise be entered in a tabulated list under the title or some other convenient place on the chart. 5

Inner harbour light-buoys and beacons should not be inserted on coastal charts, and against other light-buoys only the character of the light should be inserted. 10

On ocean charts, lights which are visible 15 miles or over should alone be inserted and then only their character and colour.

On all charts, writing should be inserted as much as possible clear of the water, unless the relative objects are on the water and care should be taken not to obliterate any information already on the chart. When cautionary or tidal notes, &c., are inserted, they should be written in a convenient but *conspicuous* place, preferably near the title, where they will not interfere with other details. 15

Erasures should never be made but the details should, when necessary, be crossed through in waterproof red ink. 20

Admiralty Notices to Mariners are occasionally accompanied by reproductions of portions of charts (known as "blocks",) and when correcting charts from such blocks the following points should be borne in mind :—

- (i) A block may not only indicate the insertion of new information, *but also the omission of matter previously shown*. The latter would, however, invariably be mentioned in the text of the Notice, and the fact that a block accompanies a Notice should not cause the text of the Notice to be disregarded. 25 30
- (ii) The limiting lines of a block are determined for convenience of reproduction and need not be adhered to when cutting out for pasting on the chart, provided that the point mentioned in the preceding paragraph is taken into consideration. 35
- (iii) The new information shown on a block can sometimes be inserted on the chart by hand, the reason for issuing a block in such a case being to avoid a long description of the new information in the text of the Notice.
- (iv) Owing to distortion the blocks do not always fit the charts exactly, care should therefore be taken when pasting a block on to a chart that the more important navigational corrections fit as closely as possible. This can best be assured by fitting the block while it is dry and making two or three pencil ticks round the edges for use as fitting marks after the paste is applied. 40 45

Corrections from Temporary or Preliminary Notices to Mariners should be inserted on the charts *in pencil* and the year and number of the notice should be shown against them, e.g. :—N.M. 1742 temp. and also in the bottom left-hand corner of the chart, in pencil, *below* the small corrections notations (*see above*). Temporary corrections should be rubbed out when the notice is received cancelling them, but preliminary corrections should be inked in when the notice is received reporting that the changes have been made. 50

Charts stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents and the Admiralty Chart Depôts are *not* corrected from Temporary or Preliminary Notices to Mariners, and when charts are received from one of these sources they should be
 5 corrected in pencil as necessary from the copies of such Notices already held, or from those supplied with the charts.

Corrections from Wireless Navigational Warnings concerning derelicts and drifting obstructions, the temporary extinction of lights, displacement of important aids to navigation, ice reports &c., should
 10 also be noted *in pencil*, as received, on the charts affected. Wireless Navigational Warnings of a permanent nature and those relating to derelicts and drifting obstructions dangerous to navigation are re-issued in the form of Admiralty Notices to Mariners, but other warnings are not re-issued in this way, except in special circumstances.

15 Corrections from information received from authorities other than the Admiralty should be noted, *in pencil*, on the charts affected, but no charted danger is to be expunged without the authority of the Hydrographer of the Navy.

NAVIGATIONAL PUBLICATIONS.

20 Admiralty Sailing Directions, Supplements, &c.

1. The Admiralty Sailing Directions, consisting of about 70 volumes for the whole world, contain general information useful to the navigator.

An index chart bound near the beginning of each volume shows the area dealt with and the serial numbers and limits of all Admiralty
 25 charts for the area which were published *when the volume was printed*.

Each volume is periodically revised throughout, and, in the intervals between the publication of new editions, Admiralty Notices to Mariners and Supplements are published to enable the volume to be corrected. It should, however, be clearly understood that Sailing Directions cannot
 30 be correct in all minor details after the date of the latest Supplement.

The above-mentioned corrections are not made in the Sailing Directions stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depôts.

A new edition of each volume of Sailing Directions is published at
 35 intervals of approximately from ten to twelve years. The number of the latest Admiralty Notice to Mariners used in its compilation is given in the "Advertisement" on page iii of each volume, and the numbers of the Notices affecting it between the dates of going to press and issue to ships and establishments are given in the Notice
 40 announcing its publication, to enable the new edition to be corrected before being brought into use.

A Supplement to each volume is generally published annually, each succeeding Supplement cancelling the former. When a volume is taken up for revision, however, no further Supplement to that edition
 45 is issued, but subsequent Notices to Mariners affecting it are summarised each year and issued as a separate publication, until the new edition of the volume is published.

A tabular form for notation of the existence of Supplements and Summaries of Notices is printed on the front fly-leaf of all Sailing
 50 Directions, and these notations are made as necessary in all copies issued by the Hydrographic Supplies Establishment and the Admiralty Chart Depôts.

Supplements and Summaries of Admiralty Notices to Mariners

should be retained intact. *Whenever reference is made to the Sailing Directions, the Supplement must be consulted.* The existence of a Supplement or Summary of Admiralty Notices to Mariners is to be entered in the tabular form inside the cover of the Sailing Directions.

Admiralty Notices to Mariners affecting Sailing Directions *are not* to be cut up and pasted in, but the book is to be annotated in the margin, or corrected in manuscript, as convenient. 5

2. The Admiralty List of Lights, Fog Signals and Visual Time Signals.—The Admiralty List of Lights, Fog Signals and Visual Time Signals for the world is issued in twelve parts divided 10 geographically as shown on the index chart at the beginning of each part.

Light-buoys are *not* included in the list.

The parts are published at intervals of three years, corrected to the 31st December, and in the intervals, Supplements to each 15 part, embodying all corrections to the 31st December, are published annually, the second Supplement in each case cancelling the first. Important amendments to the Admiralty List of Lights are notified in Admiralty Notices to Mariners, and minor amendments in Section III of the complete weekly editions of these Notices. (Section III also 20 includes the important amendments.)

The List should be corrected for amendments published in Section III of the complete weekly edition of the Admiralty Notices to Mariners, in red ink.

Temporary and Preliminary Notices should be noted *in pencil*. 25

These corrections are not made, however, in copies of the List of Lights, &c., stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Dépôts, and copies received from these sources shall accordingly be corrected from the Supplements (if any) and weekly editions of the Notices before being 30 brought into use.

3. The Admiralty List of Radio Signals.—The Admiralty List of Radio Signals is issued in three volumes.

Volume I.—Communications—Comprises particulars of radiotelegraph coast stations, together with general regulations; it also includes 35 such subsidiary services as medical advice supplied by radio, together with details of the organisation for transmitting British official messages to merchant ships.

Volume II.—Navigational Aids—Comprises particulars of services from direction-finding stations and radiobeacons, together with 40 radio time signals and navigational warnings (with ice signals); all relevant codes and regulations will be found in this volume.

Volume III.—Meteorological Services—Comprises particulars of weather services provided for the use of shipping (including numerous aviation services of interest to mariners), together with relevant 45 codes and lists of meteorological observation stations and aviation routes.

New editions of each volume will be published annually.

A Supplement of each volume is also issued. The Supplement to Volume I contains corrections between the date of the volume 50 going to press and the 31st of December. The Supplements to Volumes II and III embody all corrections issued between the date of going to press and the date of their issue to Ships and Establishments.

Importation amendments to the List are notified in the Admiralty Notices to Mariners, and minor amendments in Section IV of the 55

complete weekly edition of these Notices. Section IV. also includes the important amendments.

Copies of the List stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depôts are not kept corrected, and Lists received from these sources should accordingly be corrected from the Supplements and from the weekly editions of the Admiralty Notices to Mariners before being brought into use.

4. The Admiralty Tide Tables.—The Admiralty Tide Tables are published in three parts, as follows:

Part I, containing tidal predictions for Standard ports. This Part is published annually in two separate Sections, A, Home Waters, and B, Foreign Waters.

Part II, containing data for predicting tides at places which are not Standard ports, and for predicting tidal streams at places where the stream is not semi-diurnal. This Part is published at intervals of about five years with Supplements as required.

Part III, containing instructions for predicting tides and tidal streams, and for analysing observations of tides and tidal streams, with tables to assist prediction and analysis.

THE USE OF CHARTS AS NAVIGATIONAL AIDS AND GENERAL REMARKS RELATING TO PRACTICAL NAVIGATION.

Reliance on a chart.—The value of a chart must manifestly depend upon the accuracy of the survey on which it is based, and this becomes more important the larger the scale of the chart.

To estimate this the date of the survey, which is always given in the title, is a good guide. Besides the changes that, in waters where sand or mud prevails, may have taken place since the date of the survey, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail, and, until a plan founded on such a survey is tested, it should be regarded with caution. It may, indeed, be said that, except in well-frequented harbours and their approaches, no surveys yet made have been so minute in their examination of the bottom as to make it certain that all dangers have been found. The fullness or scantiness of the soundings is another method of estimating the completeness of a chart. When the soundings are sparse or unevenly distributed, it may be taken for granted that the survey was not in great detail.

It appears to be insufficiently realised that the degree of reliance which may reasonably be placed upon an Admiralty chart, even in surveys of modern date, is mainly dependent on the scale on which the survey was made. The scale for publication is now generally that of the original survey, except in the case of coast sheets which are sometimes reduced. It should not, therefore be assumed that the original survey was made on a larger scale than that published.

It must be borne in mind that the principal method of ascertaining the inequality of the bottom of the sea is by the laborious process of sounding, and that in sounding over any area, the boat or vessel obtaining the soundings is kept on given lines; that each time the lead descends, or a sonic sounding is taken, the depth over only a small area is obtained, in the case of the lead, it has a diameter of only a few inches, and that consequently each line of soundings, though miles in length, is only to be considered as representing a narrow width.

Surveys are not made on uniform scales, but each survey is made on a scale commensurate with its apparent importance. For instance, a general survey of a coast, which vessels only pass in proceeding from one place to another is not usually made on a scale larger than one inch to the nautical mile, while surveys of areas where vessels are likely to anchor, are made on a scale of three inches to the mile, and surveys of frequented ports or harbours likely to be used by fleets, on a scale of from six inches to ten inches to the nautical mile.

Close examination by sound is the only method by which surveys on a large scale can be made, and in view of the vast mileage of surveys yet requiring completion in the interests of navigation, it would be a waste of time to undertake large scale coast surveys.

The scale on which a survey is to be conducted having been settled, it is manifestly superfluous to obtain more lines of soundings than can be represented on the paper. 100 soundings, which is the maximum number that can be placed with clearness on every square inch of paper, means that on a scale of one inch to the mile each sounding on the chart occupies an area representing eight acres of actual ground, whilst on a scale of six inches to the mile each sounding represents an area of a little less than a quarter of an acre, i.e., of 100 feet square.

The following diagram represents as many soundings as can be placed legibly on a square inch of paper :—

16	15	13	13	13	14	12	11	10	9
14	15	14	14	13	13	12	11	9	8
15	15	14	17	16	14	13	10	9	
16	16	17	16	16	12	11	8½	9	10
16	17	15	12	9	7½	7½	9	10	
16	16	12	9	5½	4½	5½	6½	8½	9
22	19	16	10	3½	5½	6½	7½	8½	10
20	16	12	7½	5½	6½	6½	7½	8½	10
16	15	11	9	7½	7	7½	8½	10	11
20	17	14	11	12	10	9	10	11	13

Little assistance in detecting excrescences on the bottom is afforded by the eye, when sounding in a boat, even in clear weather, on account of the observer being within five feet of the surface; none in turbid seas. If, therefore, there is no inequality in the soundings to cause suspicion, a shoal patch between two lines may occasionally escape detection.

Lines of soundings plotted as close as may be practicable on a scale of 6 inches to the mile would be 100 feet apart, and each line would be only 2 inches in actual width.

Thus, in a chart on a scale of one inch to the mile, an inequality of some acres in extent rising close to the surface, if it happened to be situated between two lines, might escape detection; whilst in a chart on a scale of 6 inches, inequalities as large as battleships, if lying parallel with, and between the lines of soundings, might exist without detection if they rose abruptly from an otherwise even bottom.

General coast charts should not, therefore, be looked upon as infallible, and a rocky shore should on no account be approached within the ten-fathom contour line, without taking every precaution to avoid a possible danger; and even with surveys of harbours on a scale of 6 inches to the mile vessels should avoid, if possible, passing over charted inequalities in the ground, as some isolated rocks are so sharp that the lead may not find the highest part.

Better results can, however, be obtained by sonic sounding owing to the rapidity with which such soundings can be taken, but even this method will not find rocks unless the boat or vessel be directly over them.

- 5 Blank spaces among soundings mean that no soundings have been obtained in these spots. When the surrounding soundings are deep it may with fairness be assumed that in the blanks the water is also deep; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks should be
10 regarded with suspicion.

Soundings in hair line, which are shown on the latest charts in upright figures, and on other charts in sloping figures, indicate that such soundings have been taken from smaller scale charts, an unreliable source, or adapted from old and imperfect surveys.

- 15 *Fathom lines a caution.*—Except in plans of harbours that have been surveyed in detail, the six-fathom line on most Admiralty charts is to be considered as a caution or danger line against unnecessarily approaching the shore or bank within that line, on account of the possibility of the existence of undiscovered inequalities of the bottom,
20 which nothing but an elaborate detailed survey could reveal. In general surveys of coasts or of little frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for such a detailed survey. It is not contemplated that ships will approach the shore in such localities without taking special
25 precautions.

The ten-fathom line, is on rocky shores, as before mentioned, another warning, especially for ships of deep draught.

- Charts on which no fathom lines are marked must be especially regarded with caution, as it generally means that soundings were
30 too scanty and the bottom too uneven to enable them to be drawn with accuracy.

Isolated soundings, shoaler than surrounding depths, should always be avoided as there is no knowing how closely the spot may have been examined.

- 35 *Chart on largest scale always to be used.*—It sometimes happens that from press of work, only the copper plate of the larger scale chart of a particular locality can at once receive any extensive re-arrangement of coastline or sounding. This is an additional reason, besides the obvious one of the greater detail shown, why this largest scale chart
40 should always be used for navigating.

- Caution in using small scale charts.*—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards on a large-scale chart, whereas on a small scale the same amount of displace-
45 ment means large fractions of a mile.

- For the same reason bearings to near objects should be used in preference to objects farther off, although the latter may be more prominent, as a small error in bearing or in laying it down on the chart has a greater effect in misplacing the position the longer the
50 line to be drawn.

- Graduation.*—All plans are now being graduated in skeleton style before publication in order to facilitate easy reference to astronomical positions; previously published plans are also graduated as opportunity offers. The graduation is, however, of necessity
55 often based upon imperfect information of a conflicting nature; for this reason, whenever an astronomical position is quoted other

than approximate (i.e., when seconds are given), it is necessary to quote also the number of the particular chart from which the position has been derived.

In this connection it is pointed out that, whenever possible, a position should be transferred from one chart to another by bearing and distance from a distinguishing feature common to both, such as a point of land or a light, &c., and not by the graduation which may differ owing to one of the charts being constructed on later and more complete astronomical data than the other.

Distortion of printed charts.—The paper on which charts are printed is, from various causes, subject to distortion, but the effect of this is seldom sufficient to affect navigation. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree when carefully plotted upon the chart, especially if the lines are to objects at some distance. The larger the chart the greater the amount of this distortion.

Buoys.—It is manifestly impossible that any reliance can be placed on buoys always maintaining their exact position. Buoys should, therefore, be regarded as warnings and not as infallible navigating marks, especially when in exposed positions; and a ship should always, when possible, be navigated by bearings of fixed objects on shore or angles between them, and not by buoys.

Light-buoys.—The lights shown by light-buoys cannot be implicitly relied on, as, if occulting or flashing, the apparatus may get out of order, or the light may be altogether extinguished. These lights in the British isles are from 5 to 217 candle power.

Cable-buoys.—Cable-buoys marking the ends of submarine cables usually are spherical or can shaped, surmounted by a globe and occasionally a flag. Below the topmark two *white fixed* lights, disposed horizontally, may be exhibited, but they cannot be implicitly relied on.

Lights.—Circles drawn on charts round a light are not intended to give information as to the distance at which it can be seen, but solely to indicate, in the case of lights which do not show the same characteristics or colours in all directions, the bearings between which the differences occur.

All the distances given in the Admiralty List of Lights and on the charts for the visibility of lights are calculated for a height of an observer's eye of 15 feet. The table of distances visible due to height, at the beginning of each part of the Admiralty List of Lights, affords a means of ascertaining how much more or less the light is visible should the height of the eye be more or less. The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Again, refraction may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light at night, the fact is often forgotten that from aloft the range of vision is much increased. By noting a star immediately over the light a very correct bearing may be afterwards obtained from the standard compass.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by remarking its candle power, as given in the Admiralty List of Lights, and in some cases by noting how much its visibility in clear weather falls short of the range

due to the height at which it is placed. Thus, a light standing 200 feet above the sea, and only recorded as visible at 10 miles in clear weather, is manifestly of little brilliancy, as its height would permit it to be seen over 20 miles, if of any power. (See table in the
5 Admiralty List of Lights.)

The distance from a light cannot be estimated either by its brilliancy or its dimness.

On first making a light from the bridge, by at once lowering the eye several feet and noting whether the light is made to dip it may be deter-
10 mined whether the vessel is in the circle of visibility corresponding with the usual height of the eye or unexpectedly nearer the light.

Fog signals.—Sound is conveyed in a very capricious way through the atmosphere. The following points in regard to fog signals should be borne in mind :—

- 15 (a) Fog signals are heard at greatly varying distances.
- (b) Under certain conditions of atmosphere, when an air fog signal is a combination of high and low tones one of the notes may be inaudible.
- (c) There are occasionally areas around a fog signal in which it is
20 wholly inaudible.
- (d) A fog may exist a short distance from a station and not be observable from it, so that the signal may not be sounded.
- (e) Some fog signals cannot be started at a moment's notice after signs of fog have been observed.
- 25 Mariners are therefore warned that fog signals cannot be implicitly relied upon, and that *the practice of sounding should never be neglected*. Particular attention should be given to placing "Look-out men" in positions in which the noises in the ship are least likely to interfere with the hearing of the sound of an air fog signal ; as experience shows
30 that, though such a signal may not be heard from the deck or bridge when the engines are moving, it may be heard when the ship is stopped, or from a quiet position. It may sometimes be heard from aloft though not on deck.

Great assistance may be obtained from the wireless fog signals trans-
35 mitted from many important lighthouses and light-vessels, but the attention of Mariners is called to the serious dangers which may arise from their misuse. No attempt should be made to approach such a signal on a wireless bearing, whilst relying only on hearing the sound fog signal in sufficient time to alter course to avoid danger. When the
40 wireless fog signal is transmitted from a light-vessel, it is essential in order to avoid collision, that the bearing from these signals should not be kept constant.

Tides.—In navigating coastal waters where the range of the tide is considerable, caution is always necessary. The tidal predictions for
45 Standard ports in Part I of the Admiralty Tide Tables can generally be relied upon to give the times of high and low water to within a few minutes, and heights within a few tenths of a foot. Larger errors are to be expected in the predictions for places which are not Standard ports, computed from the data in Part II, but such predictions com-
50 puted from the harmonic constants are always sufficiently accurate for the general requirements of navigation. The heights of the tide at times between high and low water may usually be found within narrow limits in accordance with the instructions in Parts I and III of the Tide Tables.

55 The datums of Admiralty charts depending on Admiralty surveys vary with the type of tide, but usually conform with the International

agreement, that datum should be "a plane so low that the tide will but seldom fall below it." The datums used by different nations, however, differ very considerably and those of Admiralty charts depending on foreign surveys are always those used by the original surveyors, which vary from "lowest possible low water" to "mean low water" in tidal waters, and are usually mean sea level in non-tidal waters. 5

The datum used is always stated on large scale Admiralty charts, and full particulars of these datums will be found in Part III of the Tide Tables. 10

Caution.—Most datums are above the lowest level to which the tide may fall; the charts therefore do not always show minimum depths.

Tidal streams.—Where the tidal streams are semi-diurnal information regarding them is usually given, in a convenient part of the chart, in tabular form or by notes, special symbols being inserted at the positions to which the information refers. In certain cases, where the information available is incomplete, the streams are indicated by means of arrows. 15

Where the streams are not semi-diurnal, information cannot be given on the charts, but the harmonic constants of the stream, if known, will be found in Part II of the Tide Tables. 20

Tidal streams, particularly if rotary, may vary considerably both in direction and rate; predictions of the stream must therefore always be considered approximate.

The turn of the tidal stream is not usually coincident with the times of high and low water; in fact, though in estuaries, harbour entrances, &c., the stream usually turns at about the times of high and low water, in open channels, and along open coasts generally, the turn usually occurs more nearly at half tide. Predictions of the times of high and low water must therefore never be used as predictions of the times of slack water. 25

It should be remembered that, even where the general direction of the stream is parallel with the shore, an indraught is usually experienced when crossing the entrances to bays and inlets.

Fixing positions.—For further information on this subject, see Admiralty Manual of Navigation. 35

When in sight of land, every opportunity should be taken of fixing the ship's position by terrestrial objects.

The most usual method is by compass bearings of suitable objects, and it must be borne in mind that a fix by only two bearings is liable to error, either an absolute error in taking the bearings, or those made in applying the deviation or in laying the bearings off on the chart. For these reasons, a third or check bearing of some other object should, when possible, be taken, especially when near the shore or dangers. The intersection of these three lines on the chart will prevent any mistakes if the objects are suitably placed. 40

The most accurate method of fixing a position is by angles between well-defined objects on the chart. All ships are supplied with a station pointer, and this method should be used whenever possible.

Two conditions are, however, necessary for its successful employment; first that the objects be well chosen, and, second, that the observer is skilful, and rapid in his use of the sextant and station pointer. For the former, reference can be made to the pamphlet on the use of the station pointer; the latter is only to be obtained by practice. 50

It will readily be seen that the sextant offers great advantages, as angles can be obtained from any position whence the objects are visible. 55

In many narrow waters also, where the objects may yet be at some distance, as in coral harbours, or narrow passages among mud banks, navigation by sextant and station-pointer is invaluable, as a true position can only be obtained by its means. A small error in either taking or plotting a bearing under such circumstances may put the ship ashore.

In all cases where great accuracy of position is desired, such as the fixing of a rock or shoal, or the addition to a chart of fresh soundings or new buildings, angles should invariably be used. These should be taken to several objects, the more the better, but five objects is a good number, as the four angles thus obtained not only prevent any errors, but also furnish a means of checking the accuracy of the chart itself. When running a line of soundings, it is only necessary to take a third angle now and then; firstly to make certain that the more important soundings, as at the end of a line, are correctly placed, and, secondly, to check the general accuracy of the chart.

Attention is also directed to the very useful and handy method of fixing by the bearing and distance of a suitable object.

Should the ship be supplied with a rangefinder, its use here is obvious, but without one a very good approximate distance of an object of known height may be obtained, by observing its angle of elevation and obtaining the distance from Lecky's Offshore Distance Tables, which are supplied with all sets of charts.

Full directions for the use of these Tables are given with them.

Sometimes, when only one of the requisite objects is visible from the standard compass, a compass bearing of it and a sextant angle to the other may be used to fix the position.

The method of fixing by doubling the angle on the bow is useful when passing points of land, &c., in waters where there is either no tidal stream or current, or where this can be estimated with sufficient accuracy. This method is as follows:—

Suppose that the angle between the ship's head and an object is measured, and found to be X° , and that the time of the observation is noted. Suppose also that the time is again taken when the angle between the ship's head and the object is $2X^\circ$. Then, if the course made good is the course steered, the distance of the ship from the object, at the time that the second bearing was taken, is equal to the run (over the ground) in the interval. Hence the ship's position can at once be laid off as a bearing and distance from the object. In practice, the angle X° should not be less than about 25° .

The most useful form of this method, the so-called "four point bearing," gives an excellent fix for a departure but does not ensure safety, as the point with its outlying dangers is abeam before the position is obtained.

The above fix is only reliable if either there is no tidal stream or current, or if the stream is running directly with or against the course of the ship; if otherwise, or if leeway is to be allowed for, the above method should never be used, but the ship's position should be obtained by plotting the two bearings and the estimated course and distance made good in the interval.

A table "Distance of an object by two bearings," is supplied with certain chart folios, and is also given in Inman's Tables, by which the ship's position at the time of the second bearing can be found; any two bearings at a suitable angle to each other may be used, together with the run between them, but, again, this table should not be used when the vessel is subject to a cross tidal stream or leeway.

The use of the danger angle in passing outlying dangers with land behind them, should also not be forgotten. A vertical danger angle is useful when the danger lies off an object such as a lighthouse, the height of which is known; the angle being obtained from the afore-said Lecky's Tables. If a horizontal danger angle between two objects is used, however, caution is necessary, as, should the objects not be correctly placed on the chart, the angle taken from it may not serve the purpose. This method should not, therefore, be employed when the survey is old or manifestly imperfect. 5

When fixing by astronomical observations, attention is drawn to the great utility of the position line. Even a single position line may at times give invaluable information, as the ship must be somewhere on this line, provided that the chronometer is correct. 10

A sounding obtained at the same time may often serve to give an approximate position. Again, by steering along, or at a required distance parallel to, a single position line, a vessel may make her port or avoid a danger, although uncertain of her position. 15

A very accurate position may be obtained by observations of two or more stars at evening or morning twilight, or by the observation of a bright star at daybreak, and another, shortly afterwards, of the sun when a few degrees above the horizon. The position lines obtained from the bodies observed should differ in azimuth by 30° or more. 20

Mariners are also reminded that, with modern tables for correcting the altitude, observations of the moon entail practically no more calculation than those of a planet. Moon sights are sometimes 25 available when stars are obscured by light cloud, &c.; also an excellent position may frequently be obtained by simultaneous observations of the sun and moon.

Great use may be made of wireless bearings for fixing the ship, full details of this method, and its limitations, are given in the 30 Admiralty List of Radio Signals.

Observations for Errors of the Compass.—No opportunity should be neglected of checking the deviations of the standard compass. When coasting, and a well surveyed and fairly large scale chart is available, an excellent method of observing the deviation is by taking 35 the compass bearing of two suitable objects when in transit, and comparing this with the magnetic bearing from the chart; provided always that the objects are not too close together; also by using any leading lines, the true bearings of which are being indicated in degrees and minutes on the charts, when they are accurately known. When 40 these methods are not available, the deviation should be obtained by azimuths of a heavenly body.

Deviations should be observed on any change of course on which the ship is steadied for any material space of time; if steering a steady course, the compass error should be observed at least twice a day. 45

Change of variation of the compass.—The gradual change in the variation must not be forgotten in laying down positions by bearing on charts. The magnetic compasses placed on the charts for the purpose of facilitating plotting become in time slightly in error, and in some cases, such as with small scales, or when the lines are long the displacement of position from neglect of this change may be of importance. The compasses are re-engraved when the error amounts to a degree, but the chart plates cannot be corrected more frequently from the impossibility of making alterations often on one spot in a copper plate. 50

The geographical change in the variation is in some parts of the 55

world sufficiently rapid to need consideration. For instance, in approaching Halifax from Newfoundland the variation changes 10° in less than 500 miles, and in the English channel about 5° in 400 miles. The Variation chart should be consulted on this head.

- 5 On certain general charts embracing large areas with considerable change of variation, true compasses are placed instead of magnetic compasses, the variation being shown by *isogonic lines* (curves of equal magnetic variation), in a similar manner to the Variation chart. One or two *isogonic lines* are also sometimes placed on
10 charts, in addition to the magnetic compasses, in order to indicate the general direction of these curves, and thus facilitate the determination of the variation to be employed in portions of the chart not in immediate proximity to any one of the engraved compasses.

Local magnetic disturbance of the compass on board ship.—The
15 term "local magnetic disturbance" has reference only to the effects on the compass of magnetic masses external to the ship in which it is placed. Observation shows that such disturbance of the compass in a ship afloat is experienced only in a few places on the globe. Magnetic laws do not permit of the supposition that it is the
20 visible land which causes such disturbance, because the effect of a magnetic force diminishes in such rapid proportion as the distance from it increases that it would require a local centre of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

- 25 Such deflections of the compass are due to magnetic minerals in the bed of the sea under the ship, and when the water is shallow, and the force strong, the compass may be temporarily deflected when passing over such a spot, but the area of disturbance will be small, unless there are many centres near together.

- 30 They may also be due to wrecks lying on the bottom in moderate depths, but investigations have proved that, while deflections of unpredictable amount may be expected when very close to such wrecks, it is unlikely that deflections in excess of 7° will be experienced, nor should the disturbance be felt beyond a distance of 250 yards.

- 35 It is very desirable that whenever a ship passes over an area of local magnetic disturbance, the position should be fixed, and the facts reported as far as they can be ascertained.

Use of oil for modifying the effect of breaking waves.—Many experiences of late years have shown that the utility of oil for this purpose
40 is undoubted, and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil, skillfully applied, may prevent much damage both to ships (especially the smaller classes) and to boats, by modifying the action of breaking seas.

- 45 The principal facts as to the use of oil are as follows:—

1. On free waves, i.e., waves in deep water, the effect is greatest.
2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain, as nothing can prevent the larger waves from breaking under such
50 circumstances; but even here it is of some service.

3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use; crude petroleum is serviceable when nothing else is obtainable; but all animal and vegetable oils, such as waste oil from the engines, have great effect.

- 55 4. A small quantity of oil suffices, if applied in such a manner as to spread to windward.

5. It is useful in a ship or boat, both when running, or lying to, or in wearing.

6. No experiences are related of its use when hoisting a boat up in a sea-way at sea, but it is highly probable that much time and injury to the boat would be saved by its application on such occasions. 5

At anchor, when the sea is sufficient to render it difficult to hoist up or in boats, oil bags from forward or from the swinging booms have been found to render the sea alongside comparatively smooth.

7. In cold water, the oil, being thickened by the lower temperature, and not being able to spread freely, will have its effect much 10 reduced. This will vary with the description of oil used.

8. The best method of application in a ship at sea appears to be: hanging over the side, in such a manner as to be in the water, small canvas bags, capable of holding from one to two gallons of oil, such bags being pricked with a sail needle to facilitate leakage of the 15 oil.

The position of these bags should vary with the circumstances. Running before the wind they should be hung on either bow—e.g., from the cathead—and allowed to tow in the water.

With the wind on the quarter the effect seems to be less than in 20 any other position, as the oil goes astern while the waves come up on the quarter.

Lying to, the weather bow and another position farther aft seem the best places from which to hang the bags, with a sufficient length of line to permit them to draw to windward, while the ship drifts. 25

9. Crossing a bar with a flood tide, oil poured overboard and allowed to float in ahead of the boat which would follow with a bag towing astern, would appear to be the best plan. As before remarked, under these circumstances the effect cannot be so much trusted.

On a bar with the ebb tide it would seem to be useless to try oil 30 for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside. The effect in this case must greatly depend upon the set of the current, and the depth of the water. 35

11. For a boat riding in bad weather from a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil is diffused well ahead of the boat, and the bag can be readily hauled on board for refilling if necessary. 40

12. Towing a vessel in a heavy sea, oil is of the greatest service, and may prevent parting the hawser. Distribute from the towing vessel forward and on both sides; if used only aft the tow alone gets the benefit.

Tropical revolving storms, and practical rules for avoiding them.— 45

1. Tropical revolving storms or cyclones occur for the most part in the tropical or sub-tropical portions of the western sides of the great oceans, with the exception of the South Atlantic ocean where they are unknown. They occur also on the eastern sides of the North Pacific and South Indian oceans, in the Arabian sea and the Bay of Bengal. 50

2. Revolving storms are so named because the wind in these storms revolves round an area of low pressure situated in the centre. The direction of revolution is anti-clockwise in the northern hemisphere and clockwise in the southern hemisphere. The wind, however, does not revolve round the centre of low pressure in concentric circles 55 but has a spiral movement inwards, towards the centre.

3. Tropical storms are known by various names according to the locality in which they are experienced. In the West Indies, on the Pacific coast of Central America and in the South Pacific ocean they are called hurricanes: in the Indian ocean, Arabian sea and Bay of Bengal, cyclones: and in the western part of the North Pacific, typhoons.

4. These storms generally originate between the parallels of 5° and 20° of latitude in both hemispheres and as a rule have initially a progressive movement westward, subsequently recurving towards the pole of the hemisphere in which they are generated. Thereafter, they tend to move north-eastward in the northern hemisphere and south-eastward in the southern hemisphere, so that they invade the temperate latitudes where they may gradually acquire the characteristics of the depressions of such latitudes.

5. Tropical storms are most frequent towards the end of the hot season in both hemispheres. In the Arabian sea and Bay of Bengal, however, they have their maximum frequency and are most dangerous during the transition periods at the beginning and end of the monsoon.

6. The diameter of revolving storms may vary from twenty to some hundreds of miles. Their average rate of progress when moving westward is about 10 knots, but after recurving their average speed increases to about 20 knots. It should be remembered, however, that very great variations from these speeds are likely to occur, and especially after recurving the storms sometimes move very quickly, their rate of travel then occasionally being as much as 50 knots.

7. The winds associated with tropical storms are extremely violent, but in the centre, or eye of the storm, light variable breezes or squalls alternating with complete calms are usually encountered. In this region mountainous seas and a heavy confused swell are experienced. Just outside the central region the strongest winds of the storm system are met, accompanied by violent squalls, and in this area, in well developed storms, it is possible that a wind speed of 150 knots in gusts may be attained. With increasing distance from the storm centre the wind generally decreases progressively. The aim of the seaman should therefore be to remain as far as possible from the centre of the storm system.

8. The track followed by the centre of the storm is known as the path of the storm, and the portion of the storm field on the right of the path is called the right semi-circle, and that on the left, the left semi-circle.

9. The semi-circle which lies on the side of the track towards the usual direction or recurvature, i.e., the right semi-circle in the northern hemisphere and the left semi-circle in the southern hemisphere, is known as the dangerous semi-circle. It is so called because a ship caught in it may be blown towards the path over which the centre will pass, or the storm may recurve and the centre pass over her.

10. The semi-circle which lies on the side of the path away from the usual direction of recurvature is known as the navigable semi-circle. A ship situated within this semi-circle will tend to be blown away from the path of the storm centre and the recurvature of the storm will increase her distance from the centre.

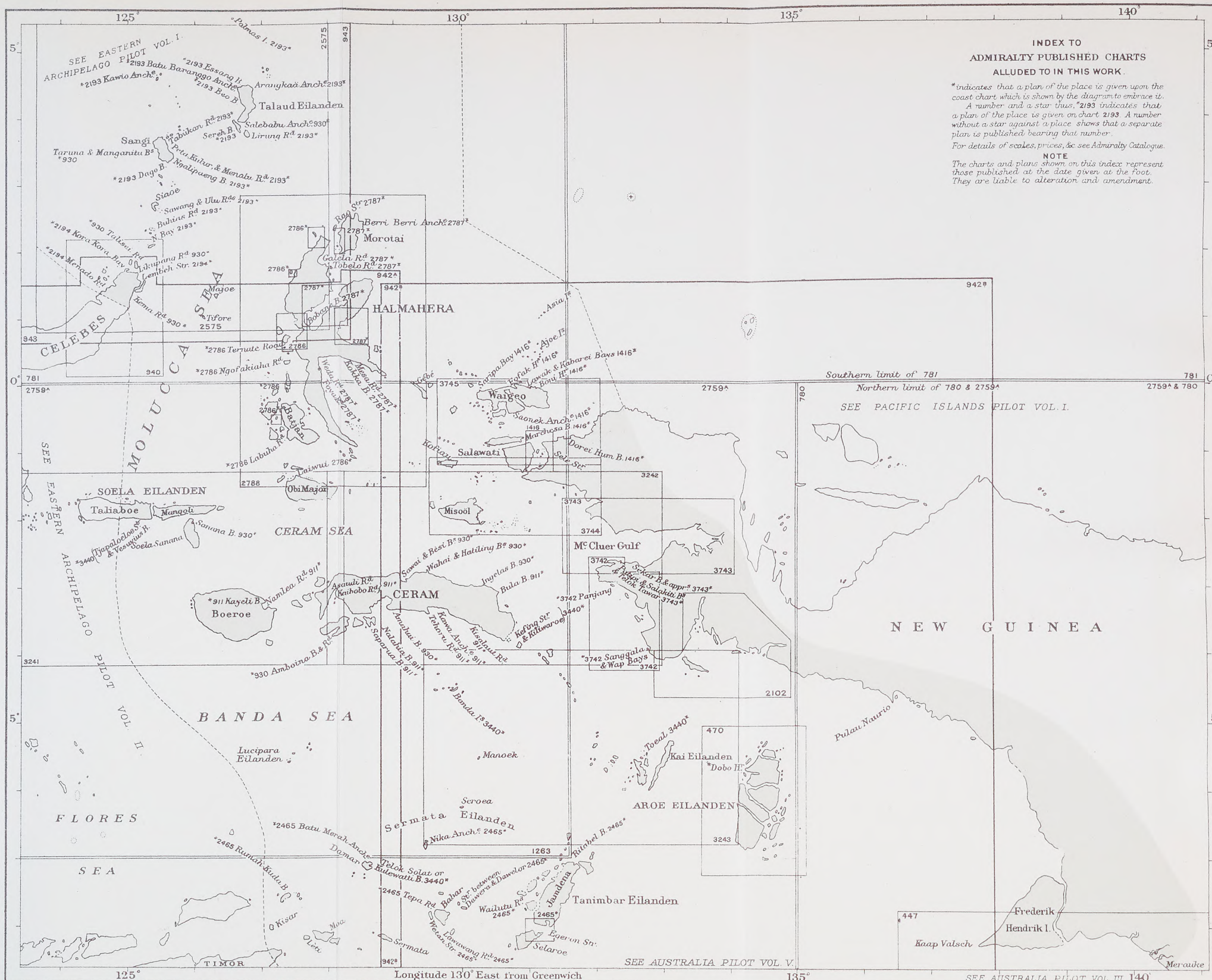
11. The indications of the approach of a tropical storm are:—

- (a) A swell not caused by the wind then blowing.
- (b) A fall in the barometer which may be divided into three phases:—

- (i) A slow fall during which the diurnal variation is still apparent, and which usually occurs from 500 to 120 miles from the centre of the storm.
 - (ii) A distinct fall during which the diurnal variation is almost completely masked and which usually occurs from 120 to 50 miles from the centre.
 - (iii) A rapid fall usually occurs from 60 to 10 miles from the centre.
- (c) The reading of the barometer being 2 to 3 mb. below the normal for the time of the year is a probable indication of the formation of a tropical storm in the vicinity.
- (d) An appreciable change in force and/or direction of the wind.
- (e) The formation of convergent streaks or bands of cirrus cloud.
- (f) An ugly threatening appearance of the sky, and lurid sky colourings at sunrise and sunset.
12. In order to judge the best way to act if there is reason to suppose a storm is in the vicinity, a seaman requires to know:—
- (a) the bearing of the centre of the storm;
 - (b) the path of the centre;
 - (c) the semi-circle in which the ship is situated; and in order more easily to determine these matters it will sometimes be better to stop or heave to.
13. If an observer faces the wind, the centre of the storm will be from 12 to 8 points on his right-hand side in the northern hemisphere, and on his left in the southern hemisphere; 12 points at the beginning of a storm, gradually decreasing to 8 points towards the centre.
14. The course of the storm centre can be approximately determined by taking two such bearings with an interval of from two to three hours between observations, provided that there has been a wind shift during the interval and that allowance is made for the ship's movement.
15. If the wind shifts to the right the vessel is in the right semi-circle, if to the left in the left semi-circle; if the wind is steady in direction but increasing in force, she is in the direct path of the storm.
16. A further check of the bearing and path of the storm may often be obtained by noting the direction from which the swell is coming and any change in this direction. The swell usually travels directly outwards from the storm centre.
17. If in the dangerous semi-circle, i.e., the right semi-circle in the northern hemisphere and the left semi-circle in the southern hemisphere, a steam vessel should steer to windward away from the assumed path of the storm, or stop and lie to if there is insufficient sea room.
- A sailing vessel should heave to, on the starboard tack in the northern hemisphere and on the port tack in the southern hemisphere.
18. If the seaman has reason to believe that his vessel is in the direct path of the storm, or if in the navigable semi-circle (i.e., the left semi-circle in the northern hemisphere and the right semi-circle in the southern hemisphere), he should run with the wind on the starboard quarter in the northern hemisphere and on the port quarter in the southern hemisphere, away from the assumed path of the storm until the barometer begins to rise.
19. If there is insufficient room to run when in the navigable semi-circle, a steam vessel should stop and lie to, and a sailing vessel should heave to on the port tack in the northern and on the starboard tack in the southern hemisphere.

20. If in harbour, or at anchor, a seaman should be just as careful in watching the signs and ascertaining the probable path of the storm centre, as he may be able to point his ship, or shift his berth with advantage.

- 6 21. In regions where tropical storms are encountered the local meteorological services issue special warning messages by wireless during the storm season giving particulars of the position and probable path of any storm which is in the vicinity. Particulars of these messages are given in the Admiralty List of Radio Signals.



INDEX TO
ADMIRALTY PUBLISHED CHARTS
ALLUDED TO IN THIS WORK.

* indicates that a plan of the place is given upon the coast chart which is shown by the diagram to embrace it.
A number and a star thus, *2193 indicates that a plan of the place is given on chart 2193. A number without a star against a place shows that a separate plan is published bearing that number.
For details of scales, prices, &c. see Admiralty Catalogue.

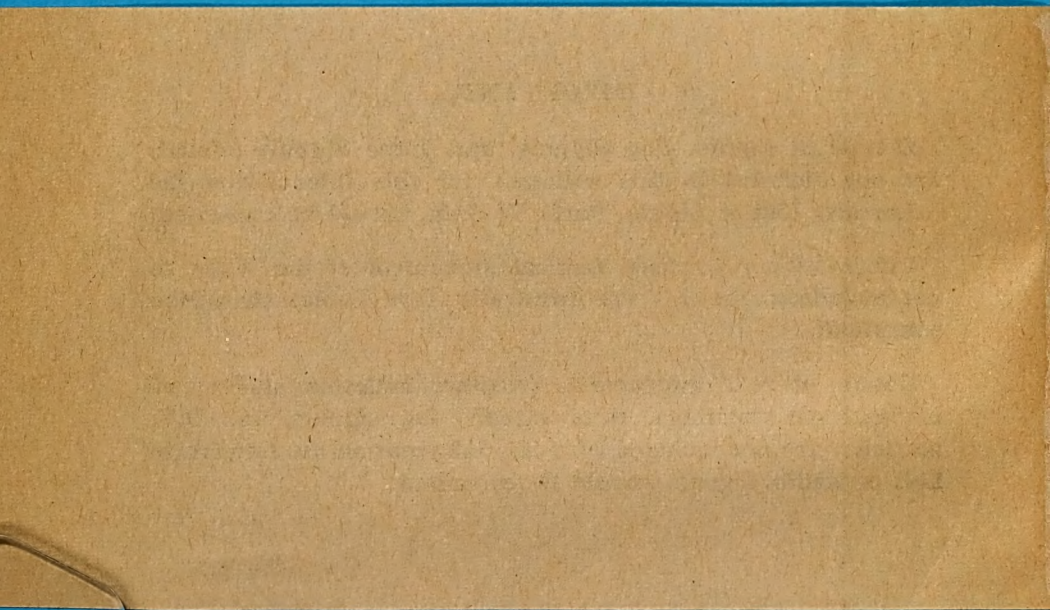
NOTE
The charts and plans shown on this index represent those published at the date given at the foot. They are liable to alteration and amendment.

IMPORTANT.

Details of Lights, Fog Signals, and Time Signals (visual) are not included in this volume ; for this information the Admiralty List of Lights, Parts VI & X, should be consulted.

Information regarding Vertical Movement of the Water is not included ; for this the Admiralty Tide Tables should be consulted.

Details of W/T information (weather bulletins, storm and navigational warnings, time signals, fog signals, and D.F. stations) are not included ; for this information the Admiralty List of Radio Signals should be consulted.



EASTERN ARCHIPELAGO PILOT, VOL. III

CHAPTER I

GENERAL REMARKS.—CURRENTS.—TIDAL STREAMS.—SIGNALS.—
NETHERLANDS EAST INDIES.—SUBMARINE CABLES.—METEOROLOGY.

GENERAL REMARKS.—This volume contains a description of the south-eastern portion of the Eastern archipelago, namely, the islands that border the route usually followed by steam vessels from the China sea, through the Celebes, Molucca and Banda seas towards Australia ; it includes a description of the north-eastern extremity of Celebes, the Molukken archipel, the islands in the Banda sea, and the coasts of the western end of New Guinea. 5

At the head of the Netherland East Indies is a Governor-General with the authority of a Viceroy ; in the civil administration under him are Residents, Assistant Residents, Controleurs and Posthouders. The whole of the colonies are divided into two main divisions, one comprising Java and Madoera, and the other all the outlying possessions. 10

Talaud and Sangi groups.—These groups are the principal of a chain of islands extending from the north-eastern extremity of Celebes to the southern end of Mindanao, and from their general formation, appear to have been formerly joined to Minahasa. The islands of the Sangi group are entirely volcanic, Gunong Awoe, in Sangi, being one of the most formidable volcanoes in the archipelago. 15

Both groups are governed by their own rajahs, under the Resident of Menado. 20

Celebes.—The fertile and highly cultivated district of Minahasa, occupying the north-eastern extremity of the northern peninsula of Celebes, is the only portion of the island dealt with in this work ; for a description of the entire island, *see* Eastern Archipelago Pilot, Vol. II.

A considerable portion of Minahasa is an uneven plateau of volcanic nature from 2,500 to 3,000 feet (762^m0 to 914^m4) high, with mountains rising to 6,000 feet (1828^m8) or more, the most notable being Kalabat, a very conspicuous, isolated, cone-shaped mountain 6,631 feet (2021^m1) high. Streams and rivers flow in all directions from these mountains, but none of them are navigable, except for a very short distance by small craft ; the most important is Menado rivier, which has its origin in Meer van Tondano, situated in the middle of the Minahasa district. 25 30

The chief towns of Minahasa are Menado, the capital and seat of the Resident, and Kema, situated on opposite sides of the peninsula, the

former used as the chief port during the South-east monsoon, and the latter during the North-west monsoon.

Molukken archipel.—The term “Molucos” was originally applied by the Portuguese to the five islands, Ternate, Tidore, Moti, Makian, and Kajoa, but has gradually been extended to almost all the eastern islands producing spices, and the limits are consequently somewhat vaguely defined. They may be divided into two groups, separated from each other by the Ceram sea: the Noordelijke Molukken consist of Halmahera with its adjacent islands, the Batjan (Bachan) group, the Obi eilanden, and the islets Majoe (Mayo) and Tifore; the Zuidelijke Molukken consist of Boeroe (Buru), Ceram, Ambon (Amboina), and the Banda eilanden. A great volcanic belt passes through the whole length of the archipelago, giving it its distinctive character, though some of the islands are entirely without volcanoes, either active or extinct, and some appear to be wholly non-volcanic in structure.

The population of the Molukken archipel, in 1930, was 893,400.

Noordelijke Molukken are under the Resident of Ternate, and the Zuidelijke Molukken are under the Resident of Ambon.

Noordelijke Molukken.—Halmahera, although almost as large as Ceram, is comparatively unimportant. It is very mountainous and rugged, and has many volcanoes, especially on the western side of the northern peninsula; the highest peak is Gam Konora, which has an elevation of 5,139 feet (1566^m4). As regards scenery, Ternate is perhaps the finest harbour in the Netherlands East Indies, being formed by the two volcanic islands of Ternate and Tidore, which are nearly 6,000 feet (1828^m8) high. The interior of Halmahera is practically uninhabited.

The population of the Ternate Residency, in 1930, was 492,758.

Farther south, lie the two distinct and compact groups of Batjan and Obi.

Obi Major is the chief of the Obi group.

Zuidelijke Molukken.—Boeroe, despite its fertility and natural resources, is still one of the least-known islands in the Netherlands East Indies. It is mountainous, culminating near the western end in Kapalatmada, 7,967 feet (2428^m3) high, with which are connected other mountain masses gradually decreasing in height eastward, and higher and more precipitous along the southern than the northern side. In the northern part of the island the country is somewhat bare, but most of the remainder is forest clad.

Ceram is the largest island in the Molukken archipel, but its importance is by no means in proportion to its size. A very fine range of mountains runs in an easterly and westerly direction, which give it a grand and massive appearance. The highest of these is Binaija, 10,021 feet (3054^m4) high, and there are several other peaks exceeding 6,000 feet (1828^m8). The whole island is densely covered with forest.

The Ambon group consists of the main island, Ambon, and three smaller islands lying eastward of it, namely, Haroekoe, Saparoea, and Noesa Laoet, known as the Oeliasers.

The population of the Ambon group, in 1930, was 400,642.

Banda eilanden, though small in extent, are important, as here the nutmeg tree grows to its greatest perfection. There are ten islands, situated about 65 miles south-westward of the south-eastern extremity of Ceram. There are only three of any importance, namely, Groot Banda, on which are most of the nutmeg parks; Naira and Gunong Api, the volcano.

Kai eilanden.—This group consists of Noehoe Tjoet, Noehoe Rowa and Doe Rowa, and a number of islets, which are situated about

120 miles east-south-eastward of the Banda eilanden and about 70 miles from the coast of New Guinea. Most of these islands are covered with magnificent forests. Noehoe Tjoet is mountainous, the land rising gradually from sandy beaches on either coast towards the centre, where a ridge, with peaks between 2,000 and 3,000 feet (609^m6 and 914^m4) high, extends through the island from north to south. The remaining islands are encircled by extensive shoals and are comparatively low, the highest point of Noehoe Rowa attaining an elevation of 390 feet (118^m9).

About one-third of the inhabitants are Muhammadans and immigrants of varied nationality. The remainder appear to be a mixture between the Papuan and Malay. The villages are very numerous and nearly all stand close to the coast.

Aroe eilanden.—These islands, about 65 miles eastward of Kai eilanden and 62 miles from the coast of New Guinea, consist of five principal islands, or perhaps more accurately, one land mass intersected by several narrow channels, and numerous smaller islands.

The Aroe eilanden are sparsely inhabited.

Sermata eilanden.—Under this name are generally included the long chain of islands, which extend in two groups from the eastern end of Timor towards the Tanimbar eilanden, and which terminate in the Babar eilanden.

The southern group is of much lower elevation than the northern; the hills are generally well-wooded, and there are some extensive plains.

The Sermata eilanden are under the Resident of Timor, with the exception of the Babar group, which belongs to the Residency of Ambon.

Tanimbar eilanden.—This is an extensive group of islands, lying at the eastern extremity of the Sermata eilanden, and only 180 miles from the north coast of Australia. The largest island of the group is Jamdena, northward and southward of which are the islands of Larat and Selaroe, respectively. North-westward of these three islands is a continuous chain of off-lying islands, only two of which, Moloe and Seira, are of any importance.

The coast, which is much indented and fringed by reefs, is covered with coconut palms and mangroves, and bordered by precipitous coral bluffs, from 60 to 80 feet (18^m3 to 24^m4) high, on which the villages stand.

Papua or New Guinea.—This vast island is generally mountainous on its northern coast, the Arfak gebergte in the western portion, about 20 miles southward of Manokwari, attaining an elevation of 9,646 feet (2940^m1). The south coast eastward of long. 135° E. is low and swampy, covered with gigantic trees, and fringed in places by mud-banks which stretch seaward to a distance of 9 or 10 miles. This coast, however, is backed by the Nassau gebergte or Sneeuw gebergte, Carstensz Toppen, its highest peak, being situated nearly 60 miles inland. (See page 236.) Westward of the above meridian, the entire coastline, as far round as, and including, Geelvink baai, is fronted by a succession of islands, many of them of considerable size. The interior of the island is little known, but it is covered with dense forests, as is also the greater part of the coast.

CURRENTS.—The region covered by this volume is one of monsoonal winds, and the currents in the more open areas flow in accordance with the monsoon. The currents can only be described in general terms, as few actual observations are available. They are variable in either monsoon period and of no great strength, and the

strongest will not be expected in general much to exceed one knot. This is especially the case during the northerly to westerly monsoon of the northern winter, which is weaker and less steady than the south-east to southerly monsoon of the northern summer. The direction of the monsoon changes considerably within the small area covered by this volume. Thus the monsoon of the northern winter is northerly in the northern part of the Molucca sea, north-north-westerly in the southern part, north-westerly or westerly in the Banda sea, and westerly in the Arafura sea. The monsoon of the northern summer similarly changes from south-easterly in the Arafura sea to southerly or south-south-westerly in the northern part of the Molucca sea. The current should therefore sweep in the corresponding curve in either monsoon, if it were unobstructed. Large islands and groups of islets, however, obstruct the free passage of the current, which will therefore be found in general most steady and strongest in the most open parts of the seas. There are likely to be eddies near or between islands, with counter currents in some cases. One such counter current on the northern coast of Ceram is referred to on page 121.

The region is shielded by New Guinea from the direct inflow of the South Equatorial current of the Pacific, except for the small portion which enters through Torres strait in the South-east monsoon season. It is in close proximity to the region of origin of the Equatorial Counter current of the Pacific, which lies northward of Halmahera and south-eastward of Mindanao.

Equatorial currents and Counter current.—The west-going Equatorial current of the North Pacific, the North Equatorial current, associated with the North-East trade wind, extends across the equator from about lat. 25° N., on the eastern side of the ocean. On the western side, as the islands in Asia are approached, the current is found southward of about lat. 20° N. In the South Pacific, the South Equatorial current, associated with the South-east trade wind, extends from about lat. 25° S. on the eastern side of the ocean, and from about lat. 20° S. on the western side. The mean set of these currents towards their equatorial limits is almost due west.

Between the North and South Equatorial currents, the Equatorial Counter current flows eastward throughout the year between the parallels of 4° N. and 9° N., more commonly between 5° N. and 8° N. The South Equatorial current thus extends a few degrees north of the equator. The counter current does not usually exceed five degrees in width. It has been known farther south, extending nearly to the equator. The counter current varies considerably in strength, being generally from half a knot to 2 knots from May to October. It is weaker from November to April. In the northern summer, when the counter current is strongest, the main body of the South Equatorial current, flowing northward of New Guinea, turns north-westward and northward, close eastward of Halmahera, and so recurves into the counter current. A part of the North Equatorial current turns south-eastward and then southward, flowing down the east coast of Mindanao. A large part of this southerly current also recurves into the counter current. In the northern winter, when the counter current is weaker, it similarly receives part of the water of the North Equatorial current, but only a small part of the South Equatorial current, much of which turns southward, to pass in a south-easterly direction along the northern coast of New Guinea.

Molucca sea.—In the northern part of Molucca sea and in the more northerly region between the Sangi eilanden and Talaud eilanden on

the north-western side, and the northern part of Halmahera and Morotai on the south-eastern side, during the southerly monsoon, from June to September, the current sets northward, running more strongly westward of Majoe and Tifore, towards the coast of Celebes, than eastward of them. During the northerly monsoon from December to April, the current sets about south by east ; this is also stronger westward of the islands, where it may exceed one knot. 5

Banda and Arafura seas.—During the southerly monsoon, the current sets north-westward along the western coast of New Guinea, and between the Kai eilanden and Aroe eilanden, and thence westward along the southern coast of Ceram. The rate may attain $1\frac{1}{2}$ knots along the coast of New Guinea, where it is usually greatest. At the same period, an easterly current prevails on the northern side of the Sermata eilanden, between Timor and the Tanimbar eilanden, setting to windward, so that a moderately fast sailing vessel would experience no difficulty there in beating up against the monsoon. In the northerly monsoon the current in these seas usually sets with the wind ; in March, 1934, however, a west-north-westerly set, with a rate of $1\frac{1}{2}$ knots, was experienced by H.M.S. *Perseus* between Straat Manipa and the Banda eilanden, although the prevailing wind had been from westward. 10 15 20

A small proportion of westerly currents exceeding a rate of one knot occur in the Arafura sea in December and January.

TIDAL STREAMS.—As large portions of the area described in this volume have as yet been imperfectly surveyed, little information regarding tidal streams is available. In the open waters the tidal streams are not strong, and merely increase or reduce the rate of the currents due to the monsoon. In contracted passages, however, they may attain a considerable rate, details of which will be found in the body of the work. 25 30

SIGNALS.—Vessels inconvenienced by searchlights.—In the event of the navigation of a vessel being inconvenienced by the glare from searchlights near a port in the British Empire, she should make the International code signal ZO (— — . . — — —) by lamp and by whistle, siren or fog horn. 35

Both the light and sound signals should be employed, whenever possible, and should be repeated until the inconvenience is removed.

Only real urgency should necessitate the use of this signal, as unless the vessel is actually in the rays of a searchlight, it is not possible for the operators to know which projector is affected. 40

This signal is designed to assist mariners ; no liability whatever will be admitted.

This signal should also be used in similar circumstances near ports in other countries.

Aircraft distress signals.—Any aircraft in grave or imminent danger and requiring immediate assistance will make or display one or more of the following signals :— 45

1. The International distress signal S O S, by wireless telegraphy, as prescribed in the Admiralty List of Radio Signals.
2. The spoken word "Mayday" by wireless telephony, as prescribed in the Admiralty List of Radio Signals. 50
3. The International distress signal S O S, by visual signalling or any sound apparatus.

4. The International Code flag signal NC.
5. The International Code distance signal, consisting of a square flag having above or below it a ball or anything resembling a ball.
- 5 6. A continuous sounding of any sound apparatus.
7. A succession of *red* pyrotechnic lights fired at short intervals, or a *red* flare from which, at intervals of about *three seconds*, a *red* light is ejected.

Urgent signals from aircraft.—All aircraft, having a very urgent message to communicate to a vessel, concerning the safety of any aircraft, vessel or person, within range of assistance, will fly low around the vessel, firing a succession of *green* pyrotechnic lights, or will flash a succession of *green* flashes with the daylight signalling apparatus. The aircraft will, then, signal the message as prescribed in the International Code of Signals; or alight alongside the vessel; or, if unable to signal or alight, will fly towards the aircraft, vessel or person in distress. When the *green* pyrotechnic lights are seen by the vessel, a boat is to be prepared for lowering.

The signals from the aircraft are to be acknowledged by the vessel by flashing the answering sign, whether by day or at night, with the daylight signalling apparatus; if no such apparatus be carried, the answering pendant is to be hoisted close up, by day, and, at night, a *white* light is to be waved in a position away from other sources of light.

If an aircraft is in difficulties which compel her to land, but is not in need of immediate assistance, she will fire a succession of *white* pyrotechnic lights, or, at night, if not in possession of pyrotechnic lights, she will make a succession of short flashes with her navigation lights.

Non-urgent signals from aircraft.—An aircraft wishing to communicate with a vessel on a matter of no urgency will fly around the vessel to attract attention.

Aircraft firing and bombing practices.—Signal displayed by target towing vessel.—During firing and bombing practices by seaplanes of the Netherlands Royal Navy, the target towing vessel will display the International distinguishing pendant over International Code flag "B".

Signals in harbours in the territory of The Netherlands.—The following signals, with flags of the International Code of Signals, may be shown in all harbours in the territory of The Netherlands:—

40 A. From the shore.

Signal.				Signification.
Pendant No.	3 and A flag.*			Your berth is Pier I.
"	" " B " *	"	" " "	II.
"	" " C " *	"	" " "	III.
45	" " D " *	"	" " "	IV.
"	" " E " *	"	" " "	V.
"	" " F " *	"	" " "	VI.
"	" " G " *	"	" " "	VII.
"	" " I "			Time ball has not fallen at the exact moment.
50	" " K "			Time signal is out of order.
"	" " R " *			You must anchor in the road.
Blue flag				No communication owing to bad weather.

55 * In the event of two or more vessels entering a harbour at the same time, the berthing or anchoring signal for one particular vessel will

be indicated by displaying her Company (or National) flag *below* the signal.

Tidal stream signals.—

Signal.

White flag.

Blue flag.

Red flag.

Signification.

Slack water.

Ebb or out-going tide.

Flood tide.

5

B. *On board.*

Pendant No. 1 and H flag.

„ No. 2 „ M „

„ No. 3 „ J „

„ No. 1 „ N „

I require dock assistance.

Please send a motor boat.

I require water.

I have passengers from outside the Netherlands East Indies who wish to disembark.

10

Pendant No. 2 and V flag.

I require an ash-boat.

15

{ „ No. 3 „ Q „
At night, a *red* light over a
white light, 6 feet (1^m8) apart.
This signal is to be shown only
within or near the limits of the
harbour or roadstead.

I have one or more suspected cases
of infectious disease on board,
or embarked during the voyage.

20

Flag B (I am loading or unloading inflammable material or explosives) can also be used to denote, “I am loading or unloading light inflammable material.”

Vessels requiring the Company's doctor to attend on board should display their Company's flag *above* flag W. 25

Signal to denote the presence of submarines.—Netherlands vessels, which are carrying out exercises with submarines, or are escorting submerged submarines, display a red flag at the masthead.

All vessels must give a vessel, which is displaying a red flag at the masthead, a wide berth. 30

A vessel, which, for some reason, finds it necessary to approach the vessel displaying a red flag, must proceed at slow speed until the latter vessel has indicated the danger zone by means of flags, or other signals, or megaphone. 35

In every case, in these circumstances, a good look out must be kept for submarines, which may have only the periscope above water.

NETHERLANDS EAST INDIES.—Uniform system of buoyage.—The following is the system of buoyage used in the Netherlands East Indies. 40

1. The term starboard hand means that side which would be on the right hand going with the main flood stream, or, in entering a harbour, river, or estuary, from seaward; the term port hand means the left hand side, under the same circumstances.
2. Conical buoys are starboard hand buoys, as thus defined, and are painted white. 45
3. Can buoys are port hand buoys, as thus defined, and are painted black.
4. Spherical buoys mark the ends of middle grounds, or the separation of two channels; and are painted black and red in horizontal stripes, except when they lie between buoys of the same shape and colour; they are then painted conformably to these. Spherical buoys are always surmounted by topmarks, other buoys only in special cases. 50
5. Buoys termed “*verkenningstonnen*,” lying outside harbours, 55

etc., and marking the approach to seaward channels, have no special character assigned to them.

6. Wrecks are marked by buoys, painted green, conical or can according as the wreck lies on the starboard or port side of the fairway. Should the wreck be in mid-channel, it will be marked by a can buoy on one side, and a conical buoy on the other side, which buoys are to be treated as port or starboard hand buoys according to shape.

7. Topmarks are as follows :—

A diamond marks the outer or seaward side of a bank.

A cone marks the inner side of a bank.

A ball marks the starboard side of the fairway.

A truncated cone marks the port side of the fairway.

A cross is used as a special mark, and, surmounting a spherical buoy, indicates that the buoy may be passed on either side.

The ball and truncated cone are also used as topmarks for beacons.

The topmarks are of the same colour as the buoys or beacons on which they are placed.

8. The buoys of sea channels are numbered consecutively from seaward and marked by the first letter of the name of the channel. The numbers and letters are white.

At some places, small buoys, wooden beacons, projecting marks, &c., which are not official, may be found. These do not necessarily conform with the buoyage system just described.

Light-vessels.—The Netherlands light-vessels show a riding light from the fore stay, in addition to the distinguishing light.

For signals shown by light-vessels when out of position, *see* Admiralty List of Lights, &c.

Pilotage.—**Pilot signals.**—**Communication signals.**—Pilotage is compulsory for all the ports of the Netherlands East Indies, at which pilots are available.

Pilotage signals for the various harbours and coasts in the Netherlands East Indies, which apply also to light-vessels equipped to show signals connected with the pilot service, are as given hereafter. The term "by day" indicates between sunrise and sunset, and "at night" indicates the remainder of the 24 hours.

1. Pilot signals.—The following signals are to be shown by vessels entering and requiring a pilot :—

By day : (a) The National flag, surrounded by a white border one-fifth the breadth of the flag, displayed at the foremast head.

or (b) The pilot signal "P T" of the International Code of Signals.

or (c) Flag "G" of the International Code of Signals.

or (d) The distant signal, consisting of a cone point upwards, having above it two balls or shapes resembling balls.

At night : (a) A *blue* light every fifteen minutes.

(b) A bright *white* light, flashed or exhibited at short intervals, just above the bulwarks, for about one minute at a time.

(c) The signal "P T" in the Morse code made by flashing lamp.

The above signals must be shown until the pilot is on board, or until an answering signal has been shown.

Vessels arriving at night, but not wishing to enter at night, shall display the pilot signal at daybreak.

2. Answering signals by pilot light-vessels.—The following signals are shown by pilot light-vessels to entering vessels showing the pilot signal :—

Day signal.	Night signal.	Signification.
Nil.	A <i>white</i> flare or swing- ing a <i>white</i> light.	The pilot will proceed to the vessel at once.

Flag "D" of the } A *red* light over a } No pilot available in 10
International Code } *white* light. } the light-vessel; the
of Signals. } vessel may enter
without a pilot, un-
til one is met.

Currency.—As in the Netherlands, the guilder or florin of 100 cents 15
is the monetary unit, equivalent to 1s. 8d. at the gold parity, in 1928,
of 12.10 fl. to £1. The currency consists of notes, bronze, nickel, silver
and gold coins. The bronze coins consist of $\frac{1}{2}$, 1 and $2\frac{1}{2}$ cents; nickel,
5 cents; silver, 10, 25, 50, 100 and 250 cents; gold, 5 and 10 guilders.
The notes in circulation range from 5 to 1,000 guilders. There are also 20
Treasury currency notes for one and $2\frac{1}{2}$ guilders, issued by the Govern-
ment.

Weights and measures.—The metric system is in use :—

1 Square Paal	= 227 hectares	= 561.18 acres	= 320 bouws.
1 Bouw	= 1.7537 acres		
1 Katti	= 0.6176 kg.	= 1.36 lbs.	
100 Katties	= 1 picul	= 61.76 kg.	
1 Gantang	= 8 batoks		
14 Gantangs	= 1 picul		
1 El	= 27 inches.		

Language.—The Malay language is generally understood through- 30
out the Netherlands East Indies, and is in universal use by the natives.

Regulations.—The following regulations have been made by the
Netherlands Government for entering zee-gats and harbours.—

Manœuvres or other causes may necessitate the closing of the various 35
zee-gats and harbours or may make their entry subject to special
reservations.

In normal cases, the following signals will be shown from a flagstaff
in the harbour area and/or from a look-out station, or may be shown
from the light-vessels. All the shapes are black and all the shapes and 40
lights are disposed vertically :—

Day signal.	Night signal.	Signification.
A ball, a cone, point upwards, a ball.	A <i>red</i> light, a <i>white</i> light, a <i>red</i> light.	Entering prohibited.
Two cones, points together, a ball.	A <i>green</i> light, a <i>white</i> light, a <i>red</i> light.	Entering and leaving 45 prohibited.
Two cones, points together, a cone, point downwards.	A <i>green</i> light, a <i>white</i> light, a <i>green</i> light.	Leaving prohibited.

In exceptional circumstances, three red balls or three *red* lights, 50
disposed vertically, denotes that vessels are absolutely prohibited from
entering, except in most urgent cases. When this signal is seen by
a vessel approaching, she must proceed—wind and sea permitting—to
the examination vessel, which carries the same signal, stationed at the
entrance to the zee-gat.

Permission or prohibition to proceed will be given after examination. 55

All vessels proceeding must do so under the charge of a pilot, or be preceded by a warship or pilot vessel, since, from the time of making the signals, all exemptions from the necessity for taking a pilot are cancelled. Captains and Masters of vessels are to carry out the instructions of the official who has come on board from the examination vessel and must obey all signals.

If a shot is fired, where safety permits, the engines must immediately be stopped in the vicinity of the examination vessel. Failure to comply with these regulations may result in danger to the vessel and crew. As a general rule, permission to enter by night will not be granted.

If a signal is made from the shore to intimate that vessels are subject to examination, and, if there be no examination vessel stationed in the zee-gat, they must anchor or lie off.

The enforcement of such regulations at any particular zee-gat or harbour will not be announced beforehand.

Vessels arriving from any port outside the Netherlands East Indies are forbidden to communicate with the shore before obtaining permission from the commander of the guard-ship, or in case there is no guard-ship in the road, from the Harbour Master.

Every vessel without a bill of health or with an unsatisfactory bill of health shall be subject to the regulations of quarantine. Every vessel from a foreign port should be provided with a bill of health countersigned by the Netherlands Consular Officer at the port of departure.

Deratisation.—In accordance with Article 28 of the International Sanitary Convention of June 21, 1926, Deratisation can be carried out, and certificates of Deratisation can be issued, but certificates of exemption from Deratisation are not issued, at Menado, the only port affected within the area covered by this volume.

Fuel.—Coal can be obtained at Talisei, Ternate and Ambon. Fuel oil can be obtained at Ambon. For details, see the body of the work.

W/T stations.—The following coastal W/T stations for public correspondence in the area covered by this volume are :—Ambon and Dobo. For details see List published by the Bureau of the International Telecommunication Union.

Standard time.—Standard time corresponding to the meridian of 120° 00' E., or 8 hours fast on Greenwich mean time, is kept in Celebes, that corresponding to 127° 30' E., or 8½ hours fast, in the Molukken archipel and Sermata eilanden, and that corresponding to 135° 00' E., or 9 hours fast, in the Kai, Aroe and Tanimbar groups and western part of New Guinea.

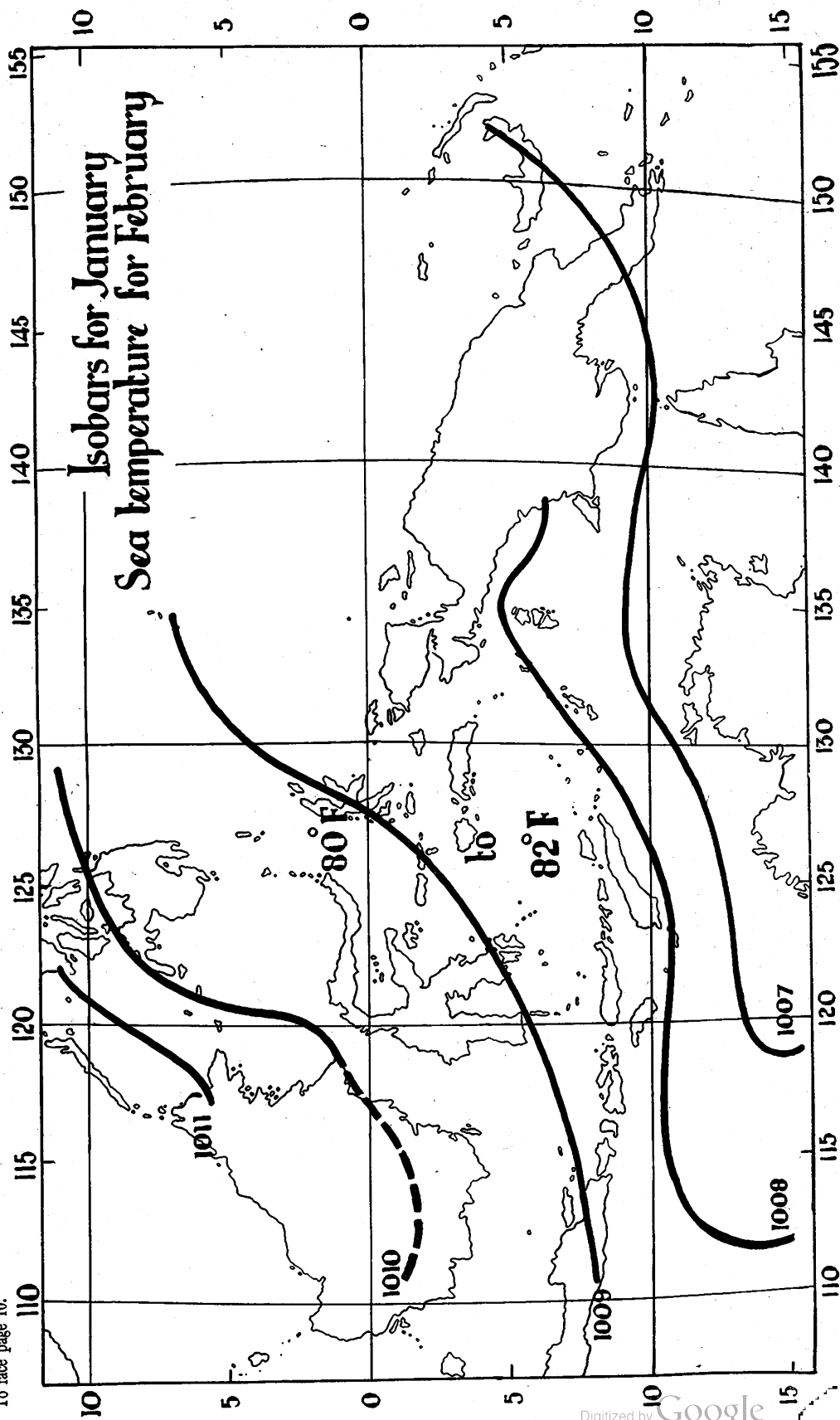
SUBMARINE CABLES.—The following Articles are taken from the International Convention for the protection of Submarine Telegraph cables, of 14th March, 1884.

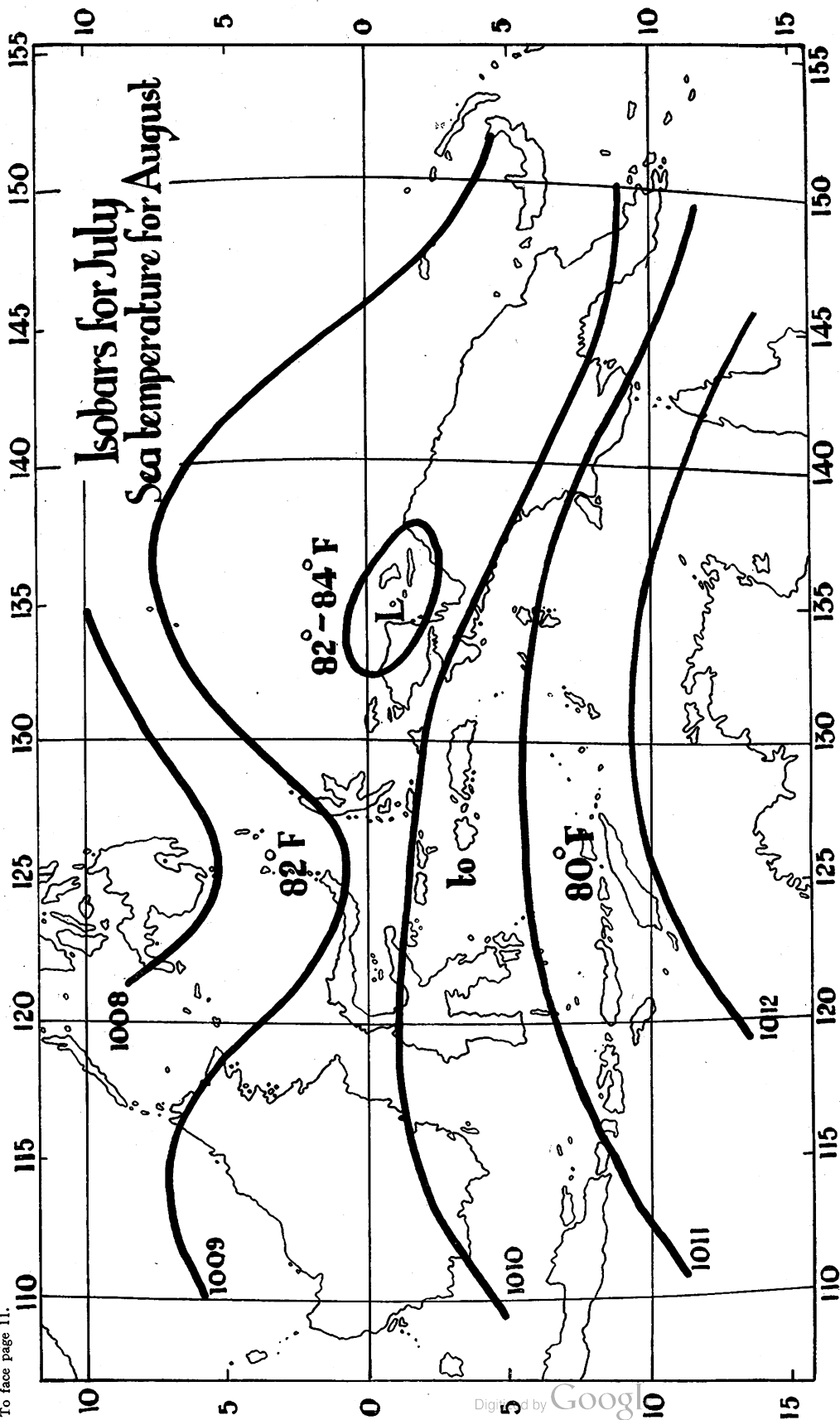
II. It is a punishable offence to break or injure a submarine cable, wilfully or by culpable negligence, in such manner as might interrupt or obstruct telegraphic communication, either wholly or partially, such punishment being without prejudice to any civil action for damages.

This provision does not apply to cases where those who break or injure a cable do so with the lawful object of saving their lives or their ship, after they have taken every necessary precaution to avoid so breaking or injuring the cable.

V. Vessels engaged in laying or repairing submarine cables shall conform to the regulations as to signals which have been, or may be, adopted by mutual agreement among the High Contracting Parties, with the view of preventing collisions at sea.

Isobars for January Sea temperature for February





When a ship engaged in repairing a cable exhibits the said signals, other vessels which see them, or are able to see them, shall withdraw to or keep beyond a distance of one nautical mile at least from the ship in question, so as not to interfere with her operations.

Fishing gear and nets shall be kept at the same distance. 5

Nevertheless, fishing-vessels which see, or are able to see, a telegraph ship exhibiting the said signals, shall be allowed a period of twenty-four hours at most within which to obey the notice so given, during which time they shall not be interfered with in any way.

The operations of the telegraph-ships shall be completed as quickly as possible. 10

VI. Vessels which see, or are able to see, the buoys showing the position of a cable when the latter is being laid, is out of order, or is broken, shall keep beyond a distance of one-quarter of a nautical mile at least from the said buoys. 15

Fishing nets and gear shall be kept at the same distance. 15

VII. Owners of ships or vessels who can prove that they have sacrificed an anchor, a net, or other fishing gear in order to avoid injuring a submarine cable, shall receive compensation from the owner of the cable. 20

In order to establish a claim to such compensation, a statement, supported by the evidence of the crew, should, whenever possible, be drawn up immediately after the occurrence; and the master must, within twenty-four hours after his return to or next putting into port, make a declaration to the proper authorities. 25

The latter shall communicate the information to the Consular authorities of the country to which the owner of the cable belongs.

METEOROLOGY.—General conditions of weather over the region.—The climate is equatorial and is hot and moist; the heat is, however, alleviated by the steady breezes. The mean temperature is about 80° throughout the year with, in general, a small diurnal range. There is a seasonal change in wind direction, the northerly monsoon blowing in the northern winter and the southerly monsoon in the northern summer. The rainfall is heavy; the amount and frequency vary considerably from one locality to another, being generally heaviest on coasts exposed to the prevailing monsoon. Over most of the area the southerly monsoon months have the least rain, but only in the south is there a definite dry season. Most of the area is outside the regions traversed by tropical storms, but they develop at times in the southern part; very rarely one has passed near the extreme northern part. There is sometimes considerable haze during the southerly monsoon. 30 35 40

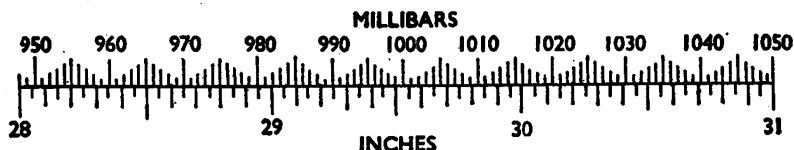
Pressure.—From December to March the average pressure decreases slightly southward; from June to September it increases southward. Charts of the average distributions of pressure in January and July are given in Figs. 1 and 2; it will be seen that, in January, average pressure decreases from between 1009 and 1010 mb. in the north to between 1007 and 1008 mb. in the south; in July it increases from about 1008 mb. in the north to over 1011 mb. in the south. The other months may be regarded as transitional between these two distributions. Changes in the average monthly pressure in any particular locality are very small; irregular changes from day to day are also, as a rule, small. The most marked change is the regular diurnal oscillation which has a range of about 3 mb. Pressure is, on the average, highest at about 1000 and 2200, and lowest at about 0400 and 1600 local 45 50 55

time. The table below gives for each hour the correction in millibars to be applied to the observed pressure to allow for the diurnal variation.

Local time .	0	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100
	mb.											
0-10° N. .	-0.6	-0.1	+0.4	+0.7	+0.8	+0.7	+0.2	-0.3	-0.9	-1.3	-1.4	-1.2
0-10° S. .	-0.6	-0.2	+0.3	+0.6	+0.7	+0.5	+0.1	-0.5	-1.0	-1.4	-1.4	-1.2

Local time .	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
	mb.											
0-10° N. .	-0.7	+0.0	+0.7	+1.3	+1.5	+1.5	+1.1	+0.5	-0.2	-0.7	-1.0	-0.9
0-10° S. .	-0.6	+0.1	+0.8	+1.4	+1.6	+1.5	+1.1	+0.5	-0.1	-0.6	-0.9	-0.9

The diagram below gives the equivalent in millibars of inches of mercury and *vice versa*.



5 **Cyclonic disturbances.**—Most of the area covered by this volume is too near the equator for the development of cyclonic disturbances. Only the extreme northern and the southern parts are occasionally affected by tropical storms travelling in a westerly direction.

In the north, it is rare that the centre of a typhoon in the China sea
10 passes near the islands. One is reported to have passed near the Talaud eilanden in October, 1904.

In the south, tropical storms have been reported near the Sermata eilanden and have been traced back as far as the vicinity of the Kai and Aroe groups. These storms have not, as a rule, reached their full
15 intensity and are reported to be less severe than the typhoons of the China sea. Further information is given under "Local Weather, Section II" on page 18.

Details of the signs of the approach of tropical revolving storms and practical rules for avoiding them are given on pages xxxi to xxxiv of the
20 section on "General Navigation."

Winds.—Corresponding with the seasonal change in the pressure distribution there is a seasonal change in wind direction; northerly winds, the northerly monsoon, blow from December to March and southerly winds, the southerly monsoon, from June to September.

25 To understand the variations in wind direction near the equator it should be borne in mind that the deflecting influence of the earth's rotation is in opposite directions north and south of the equator, and increases with distance from it. An observer with his back to the wind has the lower pressure on his left hand in the northern hemisphere and
30 on his right hand in the southern hemisphere (Buys Ballot's Law). From December to March, winds north of the equator are chiefly northerly or north-easterly, becoming north to north-west between the equator and lat. 5° S. and north-west to west, south of lat. 5° S., where they are often known as the "West monsoon." From May or June

to September the south-easterly monsoon blows in the southern part of the area, becoming southerly near the equator and from between south and south-west in the northern part of the area. South of the equator it is often known as the "East monsoon." From March to April and from October to November are transition periods with variable winds. 5
The monsoons, however, do not set in at the same time all over the area; the northerly monsoon sets in earlier in the north than in the south and the southerly monsoon sets in earlier in the south than the north.

Near the equator from about lat. 5° N. to lat. 5° S., the monsoons are 10
not very steady and near the islands they are often interrupted by local winds. Winds are mainly light. Between September and March fewer than 10 per cent. of the winds observed at sea exceed force 4 except in February; similar data are not available for the other months, but it is unlikely that there is a larger proportion of stronger 15
winds except perhaps near lat. 5° S. in July and August. The monsoons increase in steadiness and strength southward; in the region lat. 5° to 10° S., long. 130° to 140° E. from about 15 to 20 per cent. of the observed winds exceed force 4 in January and February. The strongest and steadiest winds occur, however, in this area during the 20
southerly monsoon which, as stated above, blows from a south-easterly direction. Data of the strength and steadiness of the winds are not available for this season, but it is probable that south of lat. 5° S. and east of long. 130° E. only about 30 per cent. of the winds are light in July and August when the monsoon is at its height. Considerable 25
differences in the strength and steadiness of the monsoons may occur from year to year.

Gales and squalls.—There are a few gales. The chances of encountering a wind of force 7 or above are not likely to exceed one in 20 in any month, and are usually much smaller. The average number 30
of days per month of the occurrence of any particular phenomenon at sea is not available. The chances of encountering the various phenomena have, however, been estimated from ships' observations taken at regular intervals. Local squalls occur, however, and they may reach gale force for a short period. Between September and 35
March squalls have been recorded at sea most often in January, when the chances of encountering one are about one in 4 in the area lat. 0° to 5° S., long. 130° to 135° E. and about one in 6 in the areas lat. 0° to 5° N., long. 125° to 130° E. and lat. 5° to 10° S., long. 130° to 135° E. It has been estimated that the highest speed likely to be reached in 40
a squall is about 48 knots; such high speeds are probably rare.

Land and sea breezes.—Near the coasts of the larger islands the wind is affected by land and sea breezes. These breezes are caused by the unequal heating and cooling, by radiation, of the land and sea. During the daytime the land is warmer than the sea and a sea breeze 45
tends to blow on shore; at night the land is cooler than the sea and there is a tendency for an offshore "land breeze." The conditions most favourable to the development of land and sea breezes are fine weather and a weak monsoon. Thus these breezes are best developed on coasts which are sheltered by high land from the prevailing monsoon; 50
on such coasts they are the prevailing winds. On exposed coasts the sea breeze reinforces the monsoon during the daytime; the land breeze may be sufficiently developed to produce a calm at night or may even over-ride the monsoon; this is unlikely unless there is high land near the coast or the monsoon is very weak. On coasts where the monsoon 55
blows along them, the breezes deflect it. The sea breeze is usually

stronger than the land breeze except on coasts which are backed by high land. The strength of the breezes and the time of their onset varies along the coast and with the weather, depending largely on the direction of the monsoon with reference to the coast-line. On the
 5 sheltered coasts of the larger islands the sea breeze usually sets in between 1000 and noon and is strongest in the early part of the afternoon when it may reach force 3; the land breeze usually sets in before midnight and lasts until about 0900. In wet weather, with overcast skies, there is little development of land and sea breezes. Information
 10 about these breezes on the different coasts is given under "Local Weather."

Sea temperature.—The average temperature of the surface of the sea varies between 80° and 84°. There is a slight tendency for the temperature to increase southward in the northern winter and north-
 15 ward in the northern summer.

Fog and visibility.—Fog is rare over the sea. Haze is prevalent during the southerly monsoon, especially towards the end of the season in the south where in dry years it sometimes becomes dense. The haze is partly caused by dust carried from northern Australia by the south-
 20 easterly winds and partly by smoke from the islands themselves where the fields are burnt in the latter part of the dry season. The haze becomes denser with an increase in wind speed and also with an increase in relative humidity; showers, however, cause a temporary improvement in visibility. Visibility is likely to be worst, therefore, where and
 25 when the humidity is high but no rain has fallen. Near the islands there is usually most haze in the early morning when smoke has been carried seaward by the land breeze. Further information is given under "Local Weather."

LOCAL WEATHER.—I. Molucca sea including the Talaud
 30 **and Sangi eilanden; the north-eastern end of Celebes (Minahasa); Noordelijke Molukken; Soela eilanden; Ceram sea; Boeroe and Ceram and off-lying islands.**

Winds.—Northern part of Molucca sea.—*Northerly monsoon.*—This monsoon sets in during November from between west and north-
 35 west; it becomes established in December when it veers towards north. It reaches its greatest steadiness in January and February when more than 25 per cent. of the winds observed exceed force 3. It blows mainly from between north-north-west and north-north-east, being mainly north-north-west off Menado and north-north-east off the
 40 northern part of Halmahera. It dies away in April. No gales have been recorded at sea. Squalls are most frequent in January when the chance of encountering one is about one in 6. The northerly winds are usually accompanied by a swell.

Fresh or strong and squally westerly winds occur at times. At
 45 Menado they are known locally as "barat." In such weather the west and north coasts of Sangi are dangerous for sailing vessels. In the roadstead at Menado, the "barat" sometimes causes sufficient sea to interrupt communication with the shore. "Barat" squalls often approach very rapidly, but warning may be given by a dark cloud
 50 westward. Occasionally these winds have caused damage on the coast at Menado. It is probable that these strong winds are associated with typhoons northward. For example, in November and December, 1892, strong "barat" occurred at Menado and two typhoons, one in November and one in early December, passed southward of Mindanao.
 55 During the northerly monsoon the land breeze is not well developed

at Menado, blowing only for a few hours in the latter part of the night. The sea breeze reinforces the monsoon; from December to February the wind averages force 4 in the afternoon. Reede Menado is more exposed in November when the wind blows from between west and north-west than later in the season when the prevailing direction becomes more northerly. 5

Southerly monsoon.—Southerly winds set in during May; the southerly monsoon blows from June to early October, being steadiest in July and August. It blows mainly from between south and south-west but is south-south-east off the south-east coast of Minahasa. 10

Fresh southerly winds known locally as "slatan" sometimes blow for a few days. On the south-east coast of Minahasa the "slatan" is accompanied by a troublesome swell which sometimes renders loading impossible in Reede Kema. The "slatan" on this coast is not, however, so strong as the "barat" on the north coast. 15

At this season the sea breeze at Menado sets in late (probably from about 1200 to 1300) and at the height of the monsoon blows only for 4 or 5 hours in the afternoon.

Intermonsoon months.—In April northerly winds are the most frequent and in October southerly winds. Near the island of Sangi the weather is said to be calm in October, but a swell comes from the north. 20

East coast of Halmahera.—*Northerly monsoon.*—In Bocht van Galela the monsoon blows from north-north-east, and is fairly steady. In Weda baai the wind is light and the sea calm, except in the north-western part, which is affected by north-westerly winds which sweep through the valleys into the north-western corner of the bay. 25

In February and March when the northerly monsoon is blowing its hardest northward of Weda baai, stronger winds, travelling across the narrow strip of land which starts at Tanjong Remdi, are encountered suddenly eastward of this point. Emerging from the lee of Tanjong Ngolopopo heavy seas and high surf running with the full force of the ocean will be met with northward. The period of change sets in at the end of March, and practically no more strong northerly winds will be encountered, though northward of Tanjong Ngolopopo a gentle northerly wind will still be blowing. 35

Southerly monsoon.—In Bocht van Galela the monsoon is weak and land and sea breezes prevail, the wind is south-easterly during the day and between south-west and west at night. In Boeli baai the weather is said to be better than during the northerly monsoon; winds become variable in the inner part of the bay. In Weda baai at the commencement of the monsoon squalls from south-west are experienced, occasionally increasing to a gale with heavy rain. The monsoon blows steadily from the middle of June, when the winds are southerly to south-south-easterly. 45

Heavy seas are experienced on the north coast, making communication with the shore difficult; there is, however, a sheltered anchorage at all times off the village of Mesa and in Baai van Kokka.

Southern part of Molucca sea.—*Northerly monsoon.*—This monsoon sets in about the beginning of December and the wind may blow from any direction within the north-west quarter. From January to March, when the monsoon is at its height, it blows mainly from between north-west and north; about 15 per cent. of the winds observed exceed force 3. There is sometimes a swell. 50

At Ternate the monsoon is not established until January; it blows until March. At Laboeha it is said to be mainly north-westerly but

not steady. The land breeze from Halmahera does not reach Ternate.

In Soela eilanden the monsoon sets in about the middle of November, the wind draws gradually round northward. Between November and 5 January there are occasional squalls from south-westward, which generally last only a few days, sometimes only a few hours, but which are dangerous to small craft. Calms are infrequent. A sea breeze sets in between 0900 and 1000, and a land breeze between 1900 and 2000.

10 From October to May a calm sea may be met with on the south coast of the large islands, the east coast of Sanana, and the northern part of the west coast of that island.

Near Straat Tjapaloeloe, where the force of the monsoon is pent in by low hills, the effect of the northerly monsoon is often experienced on 15 the south coast of the islands.

Southerly monsoon.—This monsoon sets in towards the end of April and increases in strength and steadiness until July, when it is at its height, and is steady from between south-east and south. It decreases in strength during October. Swell is most frequent from June to 20 August.

At Laboeha the monsoon blows from south-south-west.

In the Soela eilanden it blows from the middle of May until the middle of September. From April to November the sea is calm on the northern coast of the large islands, and on the southern portion of the 25 east coast of Sanana.

Intermonsoon months.—Winds are variable in April but westerlies are the most frequent; in November winds are mainly light from south, through west, to north-west.

Ceram sea, Ceram and Boeroe.—*Northerly monsoon.*—The 30 monsoon blows from December to March mainly from north-west, but it is not very steady. The sea is generally calm. Squalls are recorded most often in December (in about one observation in 10). They are said to occur on the north coast of Ceram, and also in Baai van Ambon.

Land and sea breezes develop on the southern coasts of Boeroe and 35 Ceram. At Amahai winds are mainly northerly in the morning, westerly in the afternoon, and north-easterly in the evening. At Ambon winds are mainly north-westerly and there is little development of land and sea breezes (*see table on page 24*).

Southerly monsoon.—This monsoon sets in during May but it is light 40 and unsteady and remains so during June. It reaches its height during August but is never very steady. It blows from between south-east and south. Its strength decreases during October but south-easterly winds are still the most frequent. The sea is usually calm, though a swell is said to occur rather frequently. The monsoon is not felt 45 on the north coast of Ceram, where land and sea breezes prevail with fine weather. Land and sea breezes also develop on the south coast; at Amahai winds are mainly northerly in the morning and south-easterly in the afternoon and evening. At Ambon, winds are mainly from between east and south-east; sudden squalls are said to occur in 50 Baai van Ambon.

In Baai van Kajeli, on the north-east coast of Boeroe, land and sea breezes succeed one another regularly; the sea breeze from about 0900 to 1100, and the land breeze from about 1700 to 1800, so that 55 sailing vessels have no difficulty in leaving the bay in the evening or at night.

Intermonsoon months.—In April winds are variable but westerlies are

the most frequent ; in November winds vary from south, through west, to north-west.

Air temperature and humidity on the coasts.—The average temperature is a little below 80°. There is very little change throughout the year. In the north January and February are the coolest months and July to September the hottest ; in the south the seasonal change is reversed. Daily maximum temperatures average from 80° to 85° in the coolest months and from 85° to 90° in the hottest months. Night minima average from 72° to 75°. Maxima are higher in the dry season than in the wet and tend to occur about an hour later ; minima are lower in the dry season. On the small islands, the diurnal variation is smaller than on the larger islands and is about 10° ; maxima are slightly lower and minima higher than on the larger islands. In very wet weather the diurnal variation is slight, but the temperature may fall rapidly several degrees during a heavy shower. On coasts which are backed by high land, cool winds descend from the mountains at night ; such winds are experienced, for example, on the coasts of Ceram. Temperature does not often rise above 95° and is not likely to fall below 65° near sea level. The highest temperatures usually occur towards the end of the dry season.

The humidity is, in general, high except on those coasts which are sheltered by high land from the prevailing monsoon. The average monthly values are from 75 to 85 per cent. in the drier months and from 85 to 90 per cent. in the wet season. The relative humidity is usually highest just before sunrise when the average exceeds 95 per cent. ; it is lowest about noon with an average value of from 60 to 65 per cent. in the driest months and from 70 to 75 per cent. in the wet season.

Cloud.—The average amount of cloud is about 6 tenths. It is rather more close to windward of high land and also during the northern winter, rather less to leeward of high land and during the southerly monsoon season.

The most prevalent cloud is cumulus. During the rainy season large cumulus clouds build up, often developing into cumulonimbus. Over the land they form mainly during the day ; the mountains usually become enveloped in the rainy season and often in the drier season. Over the sea, cumulus clouds are more prevalent at night. In the early morning over the land there are usually sheets of altostratus. During the dry season stratocumulus is the prevailing type.

Rainfall.—The rainfall is heavy ; most coasts receive more than 80 in. a year, and on some of the coasts, for example, on the north coast of Celebes, parts of the Talaud and Sangi groups, and on the south coast of Ceram, the yearly average exceeds 100 in. Among the less rainy regions with yearly averages of from 60 to 80 in. are Kema, Batjan and Obi Major, and the north coast of Boeroe. The rain is seasonal ; in general the months from July to October are the driest but they are not rainless. Over most of the area the wettest months are either those of the northerly monsoon, or the intermonsoon months from March to May, when heavy thunder-showers occur. On coasts exposed to the northerly monsoon, especially those to windward of high land, the former season preponderates. For example, at Menado, and at Wahai, on the north coast of Ceram, there are from 15 to 20 rainy days a month between December and February. (The rainy days referred to in this section include days with small amounts of rain ; except where otherwise stated they are defined as days with 0.02 in. or more.) At Sanana, March to June are the wettest months, with 15 or

16 rainy days and falls of 10 in. a month. During the drier months, from July to October, rain falls on from about 7 to 10 days a month.

Exceptions to the seasonal distribution, mentioned above, are coasts which are sheltered from the northerly monsoon and exposed to the southerly monsoon, for example, the shores of Weda baai on the east coast of Halmahera, and the south coasts of Boeroe and Ceram. These coasts are wettest from May to August, when there are from 15 to 20 rainy days a month. On the islands of Ambon and Saparoea, which are very wet at this season, there are from 20 to 25 in. a month, on from 20 to 24 days. The northerly monsoon is the driest season. A small part of the south coast of Ceram, however, has a climate similar to that of the north coast, viz., Schiereiland Hoalmoal and that part of Piroe baai westward of Kaibobo village. The separation is very sharp. Rice planting, which is done in the rainy season, takes place at Kaibobo and westward in December and January, just as on the north coast, while at Hatoesoea, a few miles south-eastward of Kaibobo, it takes place in June and July. This is caused by the high land of Ambon intercepting the moisture brought by the southerly monsoon. The estimated number of days per month in which there is heavy rain (0.4 in. or more) is given on page 25. Data for Menado and Ambon are given on pages 23 and 24, respectively.

During the rainy monsoon the rain falls in frequent heavy showers of large extent; on coasts to windward of high land it often becomes continuous. Rain falls at any time of the day or night, but on coasts exposed to the monsoon there is a tendency for the night and either the forenoon at Ambon, or the early afternoon at Menado to be the wettest times. During the intermonsoon months and the drier season rain falls chiefly in local showers, which, in the former season, are sometimes accompanied by thunder. These showers occur most often in the afternoon (earlier in the intermonsoon months than the dry season) over the land and during the latter part of the night at sea.

Fog and visibility.—No fog has been recorded in observations at sea in this area. Visibility is usually good in the northerly monsoon, except during heavy rain. Mist in the valleys may form in the early morning after rain.

During the southerly monsoon the weather is sometimes hazy. This haze increases with the advance of the season and is generally worst in September and early October. Visibility improves temporarily after showers, but the haze does not disperse finally until November. At sea, in September, the chance of encountering mist or haze (which may reduce visibility to less than 5 miles) is about one in 10 in the southern part of the area and slightly smaller north of the equator. There is a slight improvement in the south in October and November; by December the chance of mist or haze is everywhere less than one in 20 except off the south coast of Ceram.

Haze is worst in particularly dry years; for example, in 1914, it was reported that in September and October the sea was sometimes invisible from the lighthouse at Noesanive at a height of about 450 feet (137^m2) on the southern side of Ambon.

II. Banda and Arafura seas including Banda, Kai, Aroe, Sermata and Tanimbar eilanden; the north-western and western coasts of New Guinea with off-lying islands (Waigeo, Salawati).

Winds.—Banda sea, including Banda eilanden and islands between Timor and Kai eilanden.—*Northerly monsoon.*—This

monsoon begins in December or the end of November with westerly winds and is at its height in January and February, blowing from between west and north-west ; in these months about 25 per cent. of the winds observed in the western part of the sea and 35 per cent. in the eastern part exceed force 3. The monsoon is moderately steady in these months but becomes unsteady in March though it still prevails. In the east near Kai eilanden the monsoon is occasionally interrupted by northerly winds and also by strong westerly winds. Gales of force 7 have been recorded in the eastern part in January and February, but the chances of encountering one are only about one in 100. Squalls have been recorded mainly in January, when, in the eastern part of the sea, the chances of one occurring are about one in 6. On the east coast of Noehoe Tjoet local squalls, which are dangerous to the native boats and even give trouble to steamers, often occur near the village of Fako. These squalls are most dangerous near the shore on account of their sudden onset ; further out the movement of the water gives warning of their approach.

Southerly monsoon.—This monsoon begins in the latter part of April and becomes established during May ; it lasts until October in the north and November in the south. It blows very steadily from June to August in the north and from May to September in the south, its direction being south-easterly. Its strength averages force 4 and is more uniform than that of the northerly monsoon. The monsoon is said to be stronger in the southern part of the Banda sea than in any other part of the archipelago. Squalls occur on the west coast of Noehoe Tjoet near Niroen, situated 9 miles southward of Noehoe Jaan, Dangar and Hor.

Intermonsoon months.—In April winds between east and south-east are the most frequent. In November winds are south-easterly in the south and variable in the north.

Tropical storms affect the islands north-eastward of Timor chiefly in April, but sometimes in late March or early May. The storms travel in a westerly direction. By means of rainfall data, some of them have been traced back as far as the Kai and Aroe eilanden, others probably develop farther west. There are not sufficient data available to indicate their frequency, but gales are not likely to occur more than once a year. A storm was reported in April, 1778, as far north as the Banda eilanden.

Arafura sea, including the Aroe eilanden.—*Northerly monsoon.*—This monsoon blows from December to February, when it is moderately steady from between west and north-west ; in January and February about 40 per cent. of the winds observed exceed force 3 and from about 15 to 20 per cent. exceed force 4. Gales of force 7 have occasionally been recorded in February, when the chances of encountering one are about one in from 25 to 30. Squalls are most frequent in January, when the chances of one occurring are about one in 8. Near the Aroe eilanden they are said to be heavy and accompanied by much rain. On the east coast of the Aroe eilanden the wind is mainly north-north-west. On the north coast and the east coast as far as Watoelei, the tidal stream on the falling tide setting against the wind causes a considerable sea.

Southerly monsoon.—This monsoon sets in about the middle of April when winds are light and rather variable from between south and east. It is steady from June to September, especially in July and August, from a south-easterly direction. It becomes unsteady after the middle of October.

Intermonsoon months.—In March and April, winds are variable; westerlies are the most frequent in March, and winds from between east and south in April. At this season tropical storms sometimes occur (*see* under Banda sea, page 19). In November, though winds are variable, south-easterlies are the most frequent. Land and sea breezes prevail on the coasts.

Coast of New Guinea (westward of Omba rivier).—*Northerly monsoon.*—This monsoon sets in on the north coast in November and on the west coast during December. It is unsteady on the west coast in this month; south-westerly winds appear to be the most frequent. The monsoon is at its height in February when about 20 per cent. of the winds observed exceed force 3. It blows from between north-west and north-east on the north coast and is north-westerly on the west coast, but its direction is influenced by the coast line. It decreases in March. Squalls are most frequent in January when the chances of encountering one are about one in 4. Sharp local squalls have been reported in Straat Sélé in February and March, they usually occurred at night or in the afternoon. In Mc Cluer gulf the monsoon raises a certain amount of sea; during heavy squalls the strong tidal streams make conditions difficult for small craft. Heavy squalls blowing down from the mountains, accompanied by rain, have been reported in Etna baai; they usually occurred in the afternoon. At the onset of the monsoon there was a swell from south-west, which was felt as far as the entrance at Tanjong Itéwi. Rather more often than not there is a noticeable swell along the north coast.

Southerly monsoon.—This monsoon sets in at the end of April and lasts until September or October, decreasing in strength and steadiness after August. It blows from between south-east and south-west, being mainly from between south and south-west on the north coast and between south-east and south on the west coast. On the north coast of Waigeo heavy squalls blow down from the mountains at night and in the forenoon. In Mc Cluer gulf the monsoon strengthens the land breezes; in Golf van Bintoeni squalls come off the land.

Intermonsoon months.—In late March and April winds are variable and squalls are said to be frequent.

Coast of New Guinea (eastward of Omba rivier).—*See* Arafura sea.

Temperature on the coasts.—Few data are available. Mean temperature varies between about 77° and 83°.

Observations made on the Kai eilanden for one year gave an average daily maximum of 87° and minimum of 77°. The warmest months were from February to April and from September to October, with mean temperature of from 82° to 83°. The period between June and August was the coolest, with a mean temperature of from 79° to 80°. The highest temperature recorded was 95° and the lowest 71°.

On the north and north-west coasts of New Guinea there is very little variation throughout the year; daily maxima average from 85° to 87° and daily minima from 72° to 74°. In Mc Cluer gulf the nights are said to be cool. On the southern part of the west coast there is a slightly cooler season during the southerly monsoon. Golf van Bintoeni, also, is said to be coolest at this season.

Rain showers may cause a sudden decrease of temperature of about 8°.

Cloud.—At sea during the northerly monsoon, average cloudiness is from about 5 to 6 tenths in December, increasing to from 7 to 8 tenths in January, subsequently diminishing again to about 6 tenths in March.

On coasts exposed to the monsoon, for example, the north and north-west coasts of New Guinea, average cloudiness reaches from 7 to 8 tenths in January. There is less cloud during the southerly monsoon, when the average is probably from 4 to 5 tenths at sea and from 5 to 6 tenths along the southern part of the New Guinea coast. Remarks on the type of cloud made in Section I (page 17) apply also to this area. During the southerly monsoon stratocumulus clouds are common. 5

Rainfall.—In the south there is a marked dry period during the southerly monsoon between late June and October. The drought is particularly marked in the south-west, in the Sermata and Tanimbar groups rain falls on only from 5 to 10 days in this period. (The rainy days referred to in this Section include days with small amounts of rain; except where otherwise stated they are defined as days with 0.02 in. or more.) This season is not so dry on the Kai and Aroe groups, where rain falls on from 5 to 9 days a month between July and October. In November there are a few days with rain, but most of the rain falls between December and May with from 10 to 20 days a month and from 8 to 12 in. on the coasts in the wettest months. Coasts exposed to the northerly monsoon are wettest during that season, the other coasts are wettest in the intermonsoon months, March and April, when rain falls in thundery showers. 10 15 20

On the Banda eilanden, from August to October are the driest months, nevertheless rain falls on about 10 days a month; the intermonsoon months, April to June, are the wettest with about 20 days and from 12 to 15 in. a month. 25

Most of the rain falls in heavy showers.

On the northern and north-western coasts of New Guinea the wettest seasons occur either during the northerly monsoon or the intermonsoon months, with from 10 to 12 in. a month on from 12 to 20 days. In the former category are those coasts exposed to the monsoon, such as the north coast and the southern shore of Mc Cluer gulf; in the latter category are, for example, Sorong, Fak Fak and the northern shore of the Mc Cluer gulf including Golf van Bintoeni. On the north coast from September to November are the driest months with about 10 rainy days a month, but on parts of the west coast the southerly monsoon is not much drier than the rest of the year and rain occurs on about one day in two. Telok Bintoeni, which is sheltered, is said to have much fine weather during both monsoons, but during the southerly monsoon rain squalls come off the land. 30 35

Along the coast from Omba rivier to Eilanden rivier the southerly monsoon is the wettest season, though rain may occur in all months. During the southerly monsoon rain falls at any time of the day, a great deal falling in the morning; during the northerly monsoon the rain is mainly confined to afternoon showers. 40

Southward of Digoel rivier the southerly monsoon is the dry season, but showers may occur in all months. Merauke has only from 3 to 6 rainy days a month from June to November. 45

The estimated number of days per month with 0.4 in. or more of rain is given on page 25.

Visibility.—Visibility is generally good in the northerly monsoon except during heavy rain storms. Over most of the area the chances of encountering mist or haze (visibility less than 5 miles) are about one in 20 or smaller. Mist and haze have been observed most often in the area from lat. 3° to 10° S., long. 125° to 130° E. in February where one or other has been reported on about one occasion in 10. 50 55

Haze increases during the southerly monsoon and reaches its

maximum from September to November. In September and October the chances of encountering mist or haze exceeds one in 10 over most of the area except off the north-west and north coasts of New Guinea ; the latter coast has little haze in October. In November conditions
5 improve in the north and near the New Guinea coast, but in the Arafura sea, eastward and south-eastward of the Tanimbar eilanden, the chances of mist or haze are about one in 5. In this month visibility of less than half a mile has been recorded occasionally in an area extending over the Tanimbar, Kai and Aroe groups to the coast of
10 New Guinea. Off the Kai eilanden the haze (or dry fog) is said to be so thick at times that the natives are unable to find their way back to their villages. Near the Tanimbar eilanden thick haze which has the appearance of a grey fog, known as " Kuma Kuma," is said to occur every five or six years when it may persist for several days. Off the
15 Aroe eilanden, in October, during the survey by H.M.S. *Flying Fish*, the land was always enveloped in thick haze, and seldom visible more than 2 miles. In November the haze was not so thick as in October, and a few clear days were experienced.

Visibility improves in December when the chances of mist or haze are
20 less than one in 10.

On the Kai eilanden there is said to be a mist on the ground during the cool nights of the dry season from August to October.

PLACE—MENADO. LAT. 1° 30' N., LONG. 124° 50' E. Height above Mean Sea Level, 5 feet.
METEOROLOGICAL TABLE COMPILED FROM 12 TO 50 YEARS' OBSERVATIONS, 1879 TO 1933.

MONTH	PRES- SURE M.S.L. Mean	AIR TEMPERATURE Mean of				Relative humidity		Cloud amount 0-10	RAIN			WIND DIRECTION												No. of days with fog or mist	No. of days with gale						
		Daily max.	Daily min.	Highest in each month	Lowest in each month	0600 a.m.	1400 p.m.		Average fall	No. of days with 0-02 in. or more	0-4 in. or more	a.m.						p.m.													
												Percentage of observations from						Percentage of observations from													
												N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.			SE.	S.	SW.	W.	NW.	Calm
												N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.			SE.	S.	SW.	W.	NW.	Calm
January . . .	mb. 1010	° F. 85	° F. 73	° F. 89	° F. 70	% 68	% 74	in. 18-3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
February . . .	1010	85	73	89	70	74	74	14-1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
March . . .	1010	85	73	89	70	82	74	12-0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
April . . .	1009	87	73	90	71	91	71	7-8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
May . . .	1009	87	73	90	71	91	71	6-8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
June . . .	1008	87	74	90	71	90	70	6-4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
July . . .	1009	87	73	91	70	86	64	4-7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
August . . .	1009	89	74	93	69	83	60	3-8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
September . . .	1009	89	73	93	69	86	63	3-4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
October . . .	1009	89	73	92	69	90	64	4-8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
November . . .	1009	87	73	91	70	92	72	8-6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
December . . .	1008	86	74	89	71	92	73	14-6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Means . . .	1009	87	73	94*	67**	90	69	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Totals . . .	—	—	—	—	—	—	—	104-8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Extreme values . . .	—	—	—	90†	63††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
No. of years' ob- servations . . .	15	14-15	12-15	—	—	13-15	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			

Standard of time = L.M.T.

* Mean of highest each year.

** Mean of lowest each year

† Highest recorded temperature.

†† Lowest recorded temperature.

‡ Estimated.

Authorities :—Batavia, K. Mag. en Meteor. Obs. in Netherlands Indies.

Meteorological Office, Air Ministry.

PLACE—AMBON. LAT. 3° 42' S., LONG. 128° 10' E. Height above Mean Sea Level, 14 feet.

METEOROLOGICAL TABLE COMPILED FROM 5 TO 50 YEARS' OBSERVATIONS, 1879 TO 1936.

MONTH	PRES- SURE at M.S.L. Mean	AIR TEMPERATURE Mean of			Relative humidity	Cloud amount	RAIN		WIND DIRECTION #												No. of days with fog or mist		
		Daily max.	Daily min.	Highest in each month			Lowest in each month	Average fall	No. of days with 0.02 in. or more	0.4 in. or more	Percentage of observations from								Mean wind force or speed	No. of days with gale			
											Percentage of observations from												
											Percentage of observations from												
											N.	NE.	E.	SE.	S.	SW.	W.	NW.				Calm	N.
January . . .	mb.	88	76	92	74	89	66	5.0	13	16	7	3	3	7	13	19	19	—	—	—	—	—	—
February . . .	1008	88	76	92	74	89	64	4.7	12	18	4	3	0	10	25	25	0	—	—	—	—	—	—
March . . .	1008	88	76	91	74	89	67	5.3	15	16	3	6	3	10	16	29	10	—	—	—	—	—	—
April . . .	1008	86	76	90	73	92	72	11.0	18	10	13	17	7	10	13	7	13	—	—	—	—	—	—
May . . .	1008	84	75	88	72	92	74	20.3	22	14	3	17	3	3	6	3	13	—	—	—	—	—	—
June . . .	1010	82	74	85	71	91	76	25.1	24	18	0	27	13	0	13	3	24	—	—	—	—	—	—
July . . .	1011	81	74	84	70	90	76	23.7	23	17	0	39	26	3	8	3	10	—	—	—	—	—	—
August . . .	1011	81	74	85	69	89	75	16.8	20	11	3	26	45	3	0	0	3	7	—	—	—	—	—
September . . .	1011	83	74	86	71	91	71	9.5	15	3	13	20	57	7	3	0	0	10	—	—	—	—	—
October . . .	1010	86	74	89	71	91	68	6.1	13	4	3	0	17	33	7	6	7	10	—	—	—	—	—
November . . .	1009	88	75	91	72	92	66	4.5	11	3	0	17	33	7	13	7	10	13	—	—	—	—	—
December . . .	1008	88	76	92	73	91	64	5.2	13	10	6	7	13	3	19	13	10	19	—	—	—	—	—
Means . . .	1010	85	75	93*	91	70	—	—	—	6	10	18	24	4	8	9	9	12	—	—	—	—	—
Totals . . .	—	—	—	—	—	—	—	136.1	199	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Extreme values . . .	—	—	—	96†	—	—	—	96	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' ob- servations . . .	29-30	18			16-18		50		5												—	—	

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature.
‡ Lowest recorded temperature.

§ Estimated.
¶ From observations at 0600, 0900, 1500, 2000.

Authorities : Batavia, K. Mag. en Meteor. Obs. in Netherlands Indies.
Buchan, Report on Atmospheric Circulation.

Meteorological Office, Air Ministry.

Mean monthly and annual rainfall in inches.

Place	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Kena	6.1	6.3	6.6	6.7	6.8	5.9	4.4	3.1	3.1	4.2	6.2	6.3	65.7
Ternate	8.2	7.4	7.8	9.1	9.4	8.3	5.3	4.3	4.4	5.4	7.9	8.8	86.3
Kajeli	8.4	8.3	8.9	6.7	6.7	8.1	6.7	4.8	2.4	1.9	3.1	7.7	73.7
Wahai	11.4	15.1	12.6	8.1	6.3	4.9	4.2	3.5	3.4	3.7	4.4	7.7	85.3
Amahai	4.4	4.3	5.6	8.3	14.2	15.6	17.9	15.0	8.5	5.5	4.2	4.1	107.6
Saparoea	4.3	4.4	5.6	10.0	20.3	25.4	24.1	17.2	10.5	7.2	4.1	5.5	138.6
Naira	9.6	8.1	9.1	12.8	15.4	14.2	8.4	4.3	4.4	4.4	5.2	9.5	105.4
Toeal	14.1	12.4	12.5	10.1	8.7	5.7	4.4	2.7	2.1	3.5	6.3	11.9	94.4
Saumlaki	9.8	9.2	8.4	9.1	9.1	5.5	2.8	0.7	0.2	1.2	2.1	7.7	65.8
Merauke	10.1	9.3	10.2	7.3	5.0	1.9	1.6	0.9	1.3	1.9	3.4	7.4	60.3

Estimated number of days with heavy rain (0.4 in. or more).

Kena	4	4	5	5	5	4	3	2	2	3	4	5	46
Ternate	6	5	5	6	7	6	4	3	3	4	5	6	60
Kajeli	6	6	6	5	5	6	5	3	2	1	2	5	52
Wahai	8	11	9	6	4	3	3	3	2	3	3	5	60
Amahai	3	3	4	6	10	11	12	10	6	4	3	3	75
Saparoea	3	3	4	7	14	18	17	12	7	5	3	4	97
Naira	7	6	6	9	11	10	6	3	3	2	3	7	74
Toeal	10	9	9	7	6	4	3	2	2	2	4	8	66
Saumlaki	7	7	6	6	6	4	2	1	0.1	1	1	5	46
Merauke	7	7	7	5	4	1	1	1	1	1	2	5	42

Authority :—Batavia, K. Magn. en Meteor. Obs. Verhand. No. 24. Regenval in Nederlandsch-Indië.

Meteorological Office, Air Ministry.

CHAPTER II

ISLANDS BETWEEN MINDANAO AND CELEBES, NORTH-EASTERN END OF
CELEBES, AND NOORDELIJKE MOLUKKEN, EXCEPT OBI EILANDEN.

Chart 2575.

NANOESA EILANDEN. — **Dangers.** — Nanoesa eilanden (Nenusa islands), lying 112 miles east-south-eastward of the southern extremity of Mindanao, are mostly hilly. Marampit (Merampi), the
5 largest and highest of the group, has an elevation of 539 feet (164^m3), but the most conspicuous island is Kakaroetan, which has a conical peak, 345 feet (105^m2) high. The southern part of Marampit slopes steeply in the form of limestone terraces. Intata (Itata) and Kakaroetan lie on the same reef, which dries, at the southern end of the
10 group. On the outer edge of this reef north-eastward of Intata (*Lat. 4° 40' N., Long. 127° 09' E.*), is Ondengboei, a flat and bare rocky islet, except for some rocks, covered with vegetation, on its western side; there are also some rocks between Ondengboei and Intata. Malo (Mioro), south-westward of Kakaroetan, is fringed by a wide reef
15 which dries. (*See view facing page 27.*)

A 4½-fathom (8^m7) patch lies about one mile northward of Karatoeng (Karaton), about 1½ miles south-westward of Marampit; it is well marked by discoloration under favourable conditions. A 10-foot (3^m0) patch lies 4 miles southward of Karatoeng. The passage between
20 Kakaroetan and Malo is encumbered with reefs, and should not be used.

The water around the islands is very clear; the bottom, which consists mostly of sand and stones, can sometimes be seen in a depth of 16 fathoms (29^m3).

Marampit, Karatoeng and Karkaroetan are inhabited.

25 **Anchorages.**—Good anchorage may be obtained by vessels with local knowledge during the northerly monsoon, southward and south-eastward of Karatoeng, off the village of the same name, where the Government official of the group resides. During the southerly monsoon there is anchorage off the northern side of the island.

30 Vessels with local knowledge may obtain anchorage off the south-western extremity of Marampit, although the depths are great and the bottom steep; the depths are too great off Marampit and Laloehe villages, which stand on the southern side of the island.

Good anchorage may be obtained by vessels with local knowledge,
35 in a depth of 27 fathoms (49^m4), northward of the reefs off the western side of Karkaroetan. During the northerly monsoon vessels lie better southward of the passage between Karkaroetan and Malo, or southward of Malo.

Charts 943, 1263.

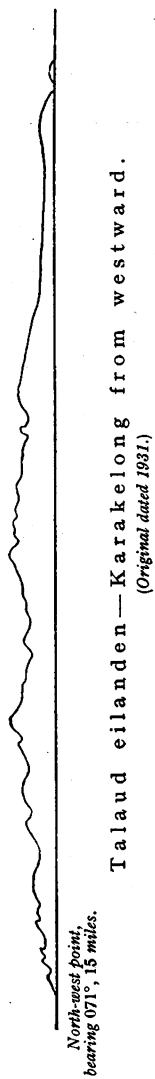
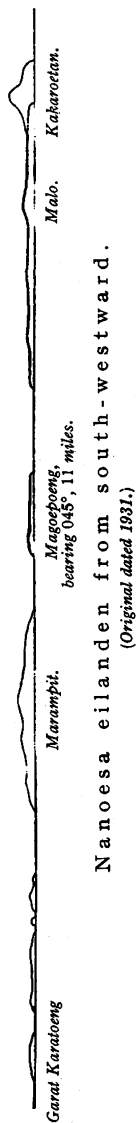


Chart 2575.

Current.—In February, 1875, H.M.S. *Challenger*, whilst dredging southward of the Nanoesa eilanden, experienced for 8 hours a steady southerly current with a rate of one knot.

TALAUD EILANDEN.—Talaud (Talaur) eilanden consist of 5
Karakelong, Salebaboe and Kaboeroeang (Kaburuang), all thickly wooded and inhabited islands, lying south-westward of Nanoesa eilanden. In places the coasts are low and flat, and sometimes marshy.

Local weather.—See page 14.

Karakelong.—Anchorages.—Karakelong, the principal island of the group, is mountainous, the mountains being divided into two parts by a lower part, which is clearly visible. In the northern and wider half there is a ridge running in a northerly and southerly direction, with Doeata, the summit, 2,228 feet (679^m1) high, situated about 15 miles from Tanjong Ambora, the northern extremity of the island, and Berawang, 1,572 feet (479^m1) high and conspicuous, about 7 miles from the same point. Northward of this ridge there is lower hilly land, which approaches the coast in places and forms steep points. On the west coast at the northern end there are detached mountains with 20 spurs extending to the coast. See view facing this page.

The coastal reef is mostly narrow and steep-to, and the least swell causes heavy breakers on it. Landing on the coastal reef is difficult, but there are several small sandy beaches. The coast is in general steep, but anchorage may be obtained in many places, although in 25 considerable depths. There is no safe anchorage, however, throughout the year, except off Kiama village, in Straat Liroeng. Most of the settlements are not visible from seaward.

Off the north coast anchorage may be obtained by vessels with local knowledge in Baai van Bamboeng, entered about 2 miles eastward of 30 Tanjong Ambora.

Chart 2193, plan of Essang bay.

Baai van Essang is entered between Tanjong Papetoe (Larue), a rocky point situated about 4½ miles southward of Tanjong Ambora (Lat. 4° 34' N., Long. 126° 48' E.), and Tanjong Boealo (Essang), about 35 1½ miles farther southward. The shores of the bay are low, and at its head is Essang village, which can be identified by a boat shed. A Government official resides here. Sungei Essang flows into the bay close northward of the village; surf quickly rises on the wide bank off the mouth.

Good anchorage may be obtained, in a depth of about 25 fathoms (45^m7), with the steep southern bank of the river bearing 086°, and Tanjong Papetoe, 002°. It is unadvisable to anchor close off the village, as the bottom is very steep there, and a strong stream flows out of the river during heavy rains.

Chart 2193, plan of Batu Baranggo anchorage.

Baai van Batoembaranggo, entered about 4 miles south-south-westward of Tanjong Boealo, affords anchorage on its northern side, in depths of from 16 to 19 fathoms (29^m3 to 34^m7).

Chart 2575.

Noesa Dolong or Jolly islet lies about three-quarters of a mile offshore about 5½ miles southward of the southern entrance point of Baai van Batoembaranggo. There is a conspicuous white tombstone on the

Chart 2575.

islet. Noesa Topor (Wawaba) lies close offshore about one mile south-south-eastward of Noesa Dolong.

Chart 2193, plan of Beo bay.

- 5 **Reede Beo.—Light.**—Beo, about 5 miles south-eastward of Noesa Topor, is the principal settlement of the island, and is the headquarters of a Government official. It stands close within the southern extremity of a bay, the shores of which are fringed by a drying bank. There is a jetty, which nearly dries at its head, at Beo, and westward of it the
10 bank consists of coral, but elsewhere of mud. There is a conspicuous tree standing on the coast about a quarter of a mile south-south-westward of the jetty.

The limits of the roadstead are the meridian of $126^{\circ} 47'$ E. and the parallel of $4^{\circ} 13' 30''$ N.

- 15 Two detached reefs lie on the coastal bank about three-quarters of a mile and $1\frac{1}{2}$ miles, respectively, north-north-westward of the head of the jetty.

A light is exhibited, at an elevation of 11 feet (3^m4), from the head of the jetty.

- 20 Anchorage may be obtained off Beo, in a depth of about 38 fathoms (69^m5), but the bottom is very steep, and the anchorage is open to the wind and sea from south-west, through west, to north-west. Vessels are recommended to approach this anchorage on the line of the prolongation of the jetty and the road ascending behind it. It is preferable, however, to anchor about one mile north-westward of the jetty,
25 where the depths are less and the bottom not so steep.

Provisions in small quantities can be obtained at Beo.

Chart 2193, plan of Arangkaa anchorage.

- Baai van Arangkaa.**—This bay is entered between a point about
30 $2\frac{1}{2}$ miles south-eastward of Tanjong Masareh, which lies 4 miles eastward of Tanjong Ambora (*Lat.* $4^{\circ} 34' N.$, *Long.* $126^{\circ} 48' E.$), and Tanjong Anderowo, about $1\frac{1}{2}$ miles farther south-eastward. Pulau Noesa (Nusa) lies on the coastal reef close northward of the north-western entrance point.

- 35 Good anchorage may be obtained, in a depth of about 16 fathoms (29^m3), with Pulau Noesa bearing about 326° , just open of the rocky north-western entrance point, and Manginpoelo, a conical hill, 428 feet (130^m4) high, situated about $2\frac{1}{4}$ miles west-south-westward of Tanjong Anderowo, bearing 225° .

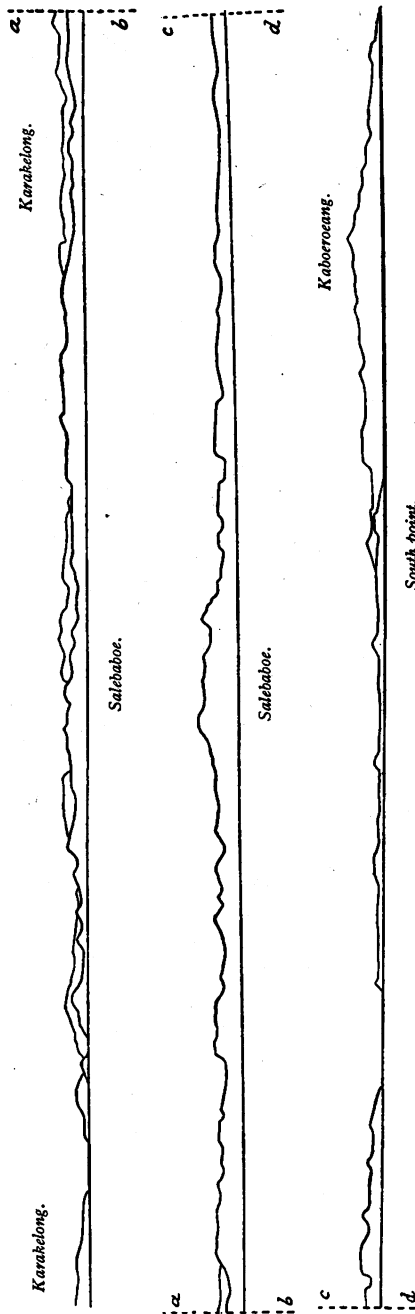
Chart 2575.

- Straat Liroeng.—Dangers.**—This strait separates the southern end of Karakelong from the north-eastern side of Salebaboe. At the south-eastern end of the strait are the islets Saraa Kechil and Saraa Besar (Saha Is), between which and the coast of Salebaboe there is
45 a clear and deep channel about half a mile wide. There are a number of shoals, with depths of from $4\frac{1}{2}$ to $5\frac{1}{2}$ fathoms (8^m2 to 10^m1), lying within 2 miles north-westward of Saraa Kechil, and others, with depths of from 2 to $5\frac{1}{2}$ fathoms (3^m7 to 10^m1), within $1\frac{1}{4}$ miles east-north-eastward of the same islet. There is usually a disturbed sea northward
50 of the northern entrance of the strait, even when it is calm elsewhere.

Anchorage may be obtained off Kiama village, on the northern side of the strait, where there is always shelter. Landing can be effected at several places on this shore.

Charts 943, 1263.

To face page 29.



South point.
Salebaboe, bearing 081°, 24 miles.

View, in three parts, of southern part of Talaud eilanden from west-south-westward.
(Original dated 1931.)

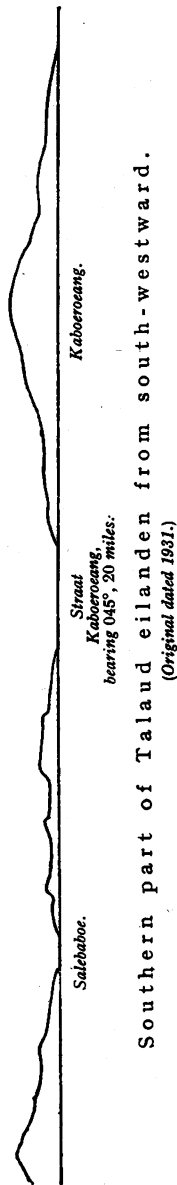


Chart 2193, plan of Lirung road.

Good anchorage may be obtained in Reede Liroeng, off the north-eastern side of Salebaboe, about $1\frac{1}{2}$ miles north-westward of Tanjong Sampo, the eastern extremity of the island, in a depth of about 16 fathoms (29^{m3}), with the flagstaff in the village bearing 214°. 5

A reef, which dries in patches, extends about $2\frac{1}{2}$ cables west-north-westward from the western extremity of Saraä Besar.

The best landing place at Liroeng is on the sandy beach near the flagstaff, as it is free from rocks. Liroeng (Lirung) is the principal village of the island and the headquarters of a native Government 10 official; the Netherlands Government official resides at Beo.

The tidal stream in Reede Liroeng sets parallel with the coast, and may attain a rate of from 2 to 3 knots.

Chart 2575.

Salebaboe.—Anchorages.—Dangers.—A mountain ridge runs 15 through the entire length of the island, with a number of conspicuous peaks, Ajambanna, with an elevation of 1,201 feet (366^{m1}), situated in the middle of the island, being the highest. The only low part of the island is in the vicinity of Moronge village, near the eastern extremity, where it is marshy. The west coast is rocky and steep. All the 20 villages are situated on the east coast. See view facing this page.

Anchorage may be obtained by vessels with local knowledge, in depths of from 22 to 27 fathoms (40^{m2} to 49^{m4}), off Kalongan village, on the western side of Salebaboe, about $1\frac{1}{4}$ miles south-eastward of Tanjong Salonggaka (Lat. 4° 02' N., Long. 126° 38' E.), the northern 25 extremity. A 3-fathom (5^{m5}) patch lies about $3\frac{1}{2}$ cables westward of the rocky point lying close northward of this village.

Chart 2193, plan of Sereh bay.

Anchorage may be obtained in Baai van Sereh, on the western side of Salebaboe, about midway between the northern and southern extremi- 30 ties, but the depths are from about 50 to 55 fathoms (91^{m4} to 100^{m6}); a vessel will be completely sheltered during the North-west monsoon.

Chart 930, plan of Salebabu anchorage.

Baai van Salebaboe, situated on the south-eastern side of Salebaboe, about $3\frac{1}{2}$ miles from Tanjong Lalawang (Taru), its southern extremity, 35 affords anchorage to small vessels in an inlet much obstructed by reefs, at the head of the bay. Salebaboe stands at the head of the inlet.

A $3\frac{1}{4}$ -fathom (5^{m9}) patch and a rock, with a depth of less than 6 feet (1^{m8}), lie about $4\frac{1}{2}$ cables eastward and about $2\frac{1}{4}$ cables southward, respectively, of Tanjong Sikata, the northern entrance point of the bay. 40

Good anchorage may be obtained by vessels with local knowledge outside the inlet, in depths of from 16 to 27 fathoms (29^{m3} to 49^{m4}), with the village bearing about 304°. With easterly and south-easterly winds some shelter is obtained from Kaboeroeang, and complete shelter during the northerly monsoon. 45

Chart 2575.

Kaboeroeang.—This island, separated from the south-eastern end of Salebaboe by Straat Kaboeroeang, about $2\frac{1}{2}$ miles wide, has two conspicuous peaks, Padian, 1,326 feet (404^{m1}) high, about 4 miles south-eastward of the north-western extremity of the island, and 50 Towoa (Toa), 1,575 feet (480^{m1}) high, about $1\frac{1}{2}$ miles southward of Padian. (See view facing this page). The coast is mostly rocky, interspersed with small sandy beaches. The coastal reef is narrow and steep-to, and the only dangers are a 13-foot (4^{m0}) patch in Straat

Chart 2575.

Kaboeroeang, about $1\frac{1}{2}$ miles west-south-westward of the northern extremity of the island, and a 10-foot (3^m0) patch, close offshore abreast Peret village, situated about $1\frac{1}{2}$ miles north-westward of
 5 Tanjong Pallo, the southern extremity of the island.

There are no good anchorages, but in calm weather a vessel may obtain anchorage in depths of over 44 fathoms (80^m5), at a distance of more than half a cable from the edge of the reef.

A strong stream may set through Straat Kaboeroeang.

- 10 **Off-lying danger.**—Northumberland rock or Napoe Mbaloe, about 6 miles south-south-eastward of Tanjong Pallo, is a small grassy bank of coral about 3 feet (0^m9) high, surrounded by drying rocks.

KAWIO EILANDEN.—These islands, lying about 60 miles westward of the Talaud eilanden, comprise Marore, Kawio, Kemboling
 15 (Kamboling), Memanoek (Mamanuk), Matoetoeang (Matutuang), Kawaloesoe and Doemarehe (Dumarche), with the dangers in their vicinity. All the islands are high, and rocky in places. Marore, Kawio, Kemboling and Kawaloesoe are inhabited, the remainder are visited temporarily for copra. See view facing this page.

- 20 Marore, the northernmost of the group, has a conspicuous peak, 456 feet (139^m0) high, on its northern side; when seen from a distance



Marore from eastward.

(Original dated 1931.)

eastward the island appears as two islets. Batu Bawaikang (Lat. $4^{\circ} 45' N.$, Long. $125^{\circ} 29' E.$), consisting of four rocks, the highest of which has an elevation of 115 feet (35^m0), lies close northward of the
 25 northern extremity of the island. There is a village, off which a vessel can anchor, on the southern side of the island, but the streams are troublesome here.

Kawio and Kemboling are connected by a reef which dries. Kemboling is 352 feet (107^m3) high. Anchorage may be obtained on
 30 the eastern side of the islands, in a depth of about 30 fathoms (54^m9), with the south-eastern point of Kawio bearing 296° , and the north-eastern point of Kemboling, 281° .

Chart 2193, plan of Kawio anchorage.

Anchorage may be obtained off the western side of the northern end
 35 of Kemboling, in a depth of 20 fathoms (36^m6), coral, with the northern extremity of Kemboling bearing 073° , and the south-western extremity, 155° ; and in a depth of 15 fathoms (27^m4), coral and coral sand, with the western extremity of Kawio bearing 357° , and the south-western extremity of Kemboling, 164° .

Chart 2575.

Marie or Ehise is a coral reef, on which there is a sand patch always above water, lying about 10 miles eastward of Kemboling. The size and height of the sand patch changes constantly, according to the wind and stream. Some rocks lie on the north-western side of the reef.

- 45 Memanoek, about 12 miles east-south-eastward of Kemboling, is 201 feet (61^m3) high. There are very irregular depths in the vicinity of Memanoek. There is a shoal, with a least depth of 6 fathoms (11^m0), about $1\frac{1}{2}$ miles eastward of the island, and a shoal, with a least depth of

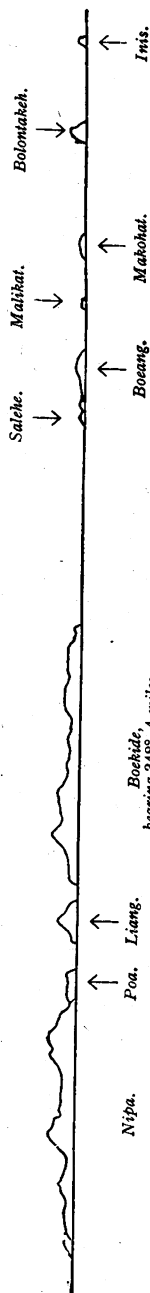
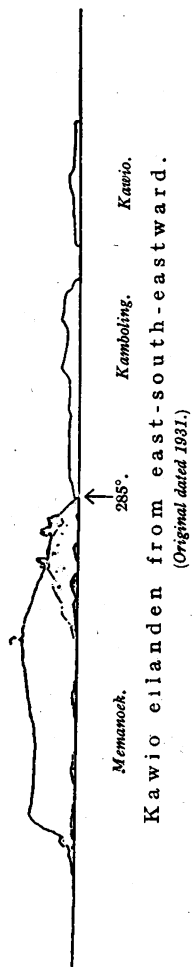


Chart 2575.

13 feet (4^m0), about 2 miles southward with a 5-fathom (9^m1) patch between. There are strong tidal streams in the vicinity of the island.

Matoetoeang, about 10 miles south-south-eastward of Memanoek, is 217 feet (66^m1) high, and is fringed by a reef. Two rocks lie off the north-western extremity of the island, outside the coastal reef. The south-eastern extremity of the island must be given a wide berth as there is shoal water for some distance offshore, and the tidal streams are strong.

Kawaloeseoe, about 26 miles south-south-westward of Kemboling, is 10932 feet (284^m1) high.



Kawaloeseoe, bearing 100° , 24 miles.

(Original dated 1922.)

Doemarehe, about 12 miles southward of Matoetoeang, is 145 feet (44^m2) high. Anchorage may be obtained, in a depth of about 38 fathoms (69^m5), southward of the island, but there may be a strong tidal stream.

A bank, with a least depth of about 10 fathoms (18^m3), lies about 6 miles south-south-eastward of Doemarehe (*Lat.* $4^\circ 14' N.$, *Long.* $125^\circ 42' E.$), and a shoal, with a least depth of $5\frac{1}{2}$ fathoms (10^m1), coral, lies about 10 miles south-south-eastward of the same island.

Louise rif, about 11 miles southward of Kawaloeseoe, has a least depth 20 of 6 fathoms (11^m0); there is usually a strong stream in this vicinity, and it is advisable to avoid it.

Current.—During the months of October and November, the current between the islands of the Kawio group was observed to set south-south-westward, and varied little from this direction, its rate varying according to the tidal stream. At the northern end of the group the rate varied from half a knot to $2\frac{1}{2}$ knots.

SANGI EILANDEN.—This group includes Sangi, situated about 65 miles west-south-westward of Talaud eilanden, and all the islands as far as, and including, Biaro, about 72 miles southward. They are all thickly covered with vegetation, and hilly or mountainous, but low and flat in places on the coasts, and even marshy on Sangi. See views facing pages 37 and 40.

A submarine volcano was reported in 1922 by s.s. *Glengyle* about 76 miles west-north-westward of the north-western end of Sangi.

Islands and dangers northward and north-eastward of Sangi.

—Lipang, about 11 miles north-north-westward of Tanjong Tendabaloe, the northern extremity of Sangi, is an island with a conical summit, 588 feet (179^m2) high, covered with coconut trees. There is a village on a sandy beach on the western side of the island. A shoal, with a depth of $6\frac{1}{2}$ fathoms (11^m9), lies about $3\frac{3}{4}$ cables east-north-eastward of the northern extremity. Anchorage may be obtained off the village, but it is deep and the bottom steep, and the tidal streams

Charts 943, 1263.

Chart 2575.

are irregular. A vessel will lie better northward of the island, but she must anchor farther offshore.

About 20 miles eastward of Lipang is Boeang (Buang), 175 feet (53^m3) high, the northernmost of a chain of islands, covered with coconut trees, extending about 7 miles southward. Salehe is an islet lying close northward of Boeang. Bowoné, with a least depth of 13 feet (4^m0), lies about 1½ miles westward of Salehe. Melihang (Malihat) and Mekohahe (Makohat), about 3½ and 4 miles, respectively, south-south-eastward of Boeang, are barren rocks. A 4-fathom (7^m3) patch lies about 1½ miles north-westward of Melihang, and there is a rock about one mile northward. There is an extensive reef close southward of Mekohahe. Balontohe, 161 feet (49^m1) high, and Inis, 89 feet (27^m1) high, are steep rocks lying about 2½ miles south-south-eastward and 3½ miles southward, respectively, of Mekohahe. There are a number of reefs and shoals between and near this chain of islands, and navigation amongst them is inadvisable.

Toade eilanden, consisting of Manipa (Nipa), Boekide (Bukide), Liang and Poa, lie about 3 miles off the north-eastern side of Sangi; they are entirely covered with coconut trees. Manipa and Boekide are inhabited. See view facing page 30.

Manipa, the south-western island, is 981 feet (299^m0) high. Manipa village (*Lat. 3° 45' N., Long. 125° 34' E.*) is situated on the southern side of the island, off which anchorage may be obtained by vessels with local knowledge, in a depth of about 44 fathoms (80^m5), with the south-eastern extremity of the island bearing 061° and the southern extremity, 264°. The coastal reef, which dries, extends about one cable offshore.

Anchorage may be obtained about 2½ cables south-eastward of the reef which extends from the south-eastern extremity of Boekide, but there is a strong stream here.

A 2½-fathom (4^m1) patch lies about 1½ miles east-south-eastward of the eastern extremity of Boekide.

During the months of November and December, a southerly stream, with a rate of from one to 2½ knots, was observed between, and eastward of, Toade eilanden; in some places the direction was variable.

Sangi.—This island, the largest of the group, is mountainous. Near its northern end is Gunong Awoe (Awu), an active volcano, 4,456 feet (1358^m2) high; earthquakes frequently occur. (See view facing page 37). The coast is alternately steep, rocky and low, and marshy in places. Fishing is carried out at night with the aid of torches, so that during the calm months numerous lights may be seen after dark. The climate is healthy.

Northern side of Sangi.—Between Kaloesaga village, situated on Tanjong Tendabaloe, and Sawang village, close westward of it, the coast is rocky and steep, but eastward and westward of this stretch the land rises gradually inland. Anchorage may be obtained, in depths of from 38 to 44 fathoms (69^m5 to 80^m5), about 1½ cables offshore, off Sawang village, which is not visible from seaward. Landing on the sandy beach is difficult during the northerly monsoon.

Western side of Sangi.—Coast.—Between Tanjong Salimar, about one mile westward of Tanjong Tendabaloe, and Tanjong Dodah (Maseli), about 4½ miles south-south-westward, and to about one mile farther southward, the coast is rocky and steep; thence to the entrance

Chart 2575.

of Baai van Tahoena, about $5\frac{1}{2}$ miles south-eastward, is steep and rocky in places, but elsewhere rises gradually, with a sand and stony beach; thence to Tanjong Kalehangeng, $1\frac{1}{2}$ miles southward, it is steep and rocky with an occasional coastal reef, which dries.

Chart 930, plan of Taruna bay.

Baai van Tahoena.—Light.—Buoy.—The limit of this roadstead is an imaginary line joining the entrance points of the bay.

Tahoena (Taruna), the capital of the Sangi eilanden, is situated on the northern side of the bay, where there is a pier, with a depth of 3 feet (0^m9) alongside the landing steps.

A light is exhibited, at an elevation of 23 feet (7^m0), from a white iron structure, on the root of the pier.

There is a small harbour available for praus at high water, situated on the northern side of the bay eastward of the pier.

Anchorage may be obtained, in depths of from 19 to 30 fathoms (34^m7 to 54^m9), with the light structure bearing between 300° and 340°. It is usually calm in the bay, but during the northerly monsoon westerly squalls, locally known as “barat,” set in suddenly; they are not dangerous for a vessel, but cause much surf on the beach, even at Tahoena; they sometimes occur at other times of the year. Strong south-westerly winds, which are frequent, are shorter in duration and less strong, but can make the working of cargo difficult. Squalls also descend from the 1,703-foot (519^m1) conspicuous peak situated about $1\frac{1}{2}$ miles eastward of Tanjong Boenakeng (Bonaking), the southern entrance point of the bay.

A grey conical buoy lies about three-quarters of a mile south-eastward of the pier.

Chart 930, plan of Manganitu bay.

Baai van Manganitoe.—Danger.—This bay, entered between Tanjong Kalehangeng (Kalingangin), about $1\frac{1}{2}$ miles southward of Tanjong Boenakeng (*Lat.* 3° 37' N., *Long.* 125° 28' E.), and a point about $1\frac{1}{2}$ miles south-eastward, is backed by hills from about 650 to 820 feet (198^m1 to 249^m9) high, covered with coconut trees.

A $1\frac{1}{4}$ -fathom (2^m3) patch lies three-quarters of a mile southward of Tanjong Kalehangeng, and is frequently well marked by discoloration.

Anchorage may be obtained, in a depth of about 33 fathoms (60^m4), with Tanjong Totone (Tatone) bearing 000°, and Boekide (Bokide), an islet lying on the shore reef at the head of the bay, 090°. Sungei Mentoehé flows out about 3 cables north-eastward of Boekide.

Chart 2575,

Coast.—Between Baai van Manganitoe and Tanjong Sahang, about $7\frac{1}{2}$ miles southward, the coast is steep and rocky in most places, and spurs slope down from Sahendaroeman, an old volcano.

Anchorage may be obtained by vessels with local knowledge, in a depth of 30 fathoms (54^m9), off Tamako village, in Baai van Tamako, about $1\frac{1}{2}$ miles northward of Tanjong Sahang. There is a better berth, in a depth of 33 fathoms (60^m4), with the flagstaff in the village bearing 080°. This bay is more exposed to southerly winds than Baai van Tahoena, but there is the same inconvenience from squalls.

Charts 2193, plan of Dago bay, 2575.

The bight between Tanjong Sahang and Tanjong Toade Manandoe (Toade Menando), about $2\frac{1}{2}$ miles south-eastward, is too deep and steep for anchoring. Kalinda village stands at the head of the bight.

Charts 2193, plan of Dago bay, 2575.

Tanjong Toade Manandoe, the western entrance point of Baai van Dago, is a rocky point, with a rocky islet lying southward of it. A 9-fathom (16^m5) patch lies about 4 cables southward of this point.

- 5 Mahoemoe (Mahome), an island, 789 feet (240^m5) high, lies on the eastern side of the entrance to Baai van Dago. Between the island and the south-western side of Sangi there is a channel available for small craft with local knowledge. In the bay it is always calm eastward of Sama, an islet connected to the western shore by a reef about 2 miles
- 10 north-eastward of Tanjong Toade Manandoe. Boats can only land at high water. A narrow channel, with a least depth of 3 feet (0^m9) in the fairway, leads to Kaloewatoe (Kalawatu) village, situated at the head of the bay about 1½ miles east-north-eastward of Sama, but it is only available for vessels with local knowledge. The village is not visible
- 15 from seaward. There is a church in the village, and a conspicuous white tomb and a house on the hill are good guides for approaching it. A stone pier extends southward over the shore reef which dries, from Dago village, situated about 3½ cables westward of Kaloewatoe.
- Chart 2575.*

- 20 Anchorage may be obtained by vessels with local knowledge off Lapango (Lipango) village, situated on the coast of Sangi eastward of Tanjong Boewoe, the southern extremity of Mahoemoe, in a depth of about 30 fathoms (54^m9), about half a cable from the coastal reef, which dries, with the village bearing 052°.
- 25 About 1½ miles southward of Tanjong Boewoe (*Lat. 3° 24' N., Long. 125° 33' E.*) is a reef, on which are the islets Dakoepang and Mendakoe, the latter being 257 feet (78^m3) high. A rock, awash, lies about 6 cables westward of Dakoepang, and a shoal, with a depth of 6 fathoms (11^m0), lies nearly one mile south-westward of Mendakoe.
- 30 Bebalang, an island 428 feet (130^m4) high, with a conspicuous large round-topped tree on its summit, lies about one mile southward of Mendakoe. A 19-foot (5^m8) patch lies about one mile south-eastward of the southern extremity of Bebalang. Anchorage may be obtained by vessels with local knowledge, in a depth of about 44 fathoms (80^m5),
- 35 about 2½ cables offshore, off Bebalang village, situated on the northern side of the island of the same name, with the north-eastern extremity of the island in line with Tanjong Poengowatoe (Punguwatu), the southern extremity of Batoenderang, bearing 096°, and the village flagstaff, 146°. Batoenderang is an island, 612 feet (186^m5) high,
- 40 separated from the southern extremity of Sangi by a passage, which dries, about a quarter of a cable wide.

Tidal streams.—The tidal streams outside the bays off the western side of Sangi set at a rate of about 2 knots.

- Eastern side of Sangi.**—**Coast.**—Between Tanjong Peliang, about
- 45 6½ miles south-eastward of Tanjong Tendabaloe (page 31), and Tanjong Boehiase, about 2½ miles farther south-eastward, the land rises gradually from the coast; thence to Tanjong Mahema, the northern extremity of Lebessan peninsula, about 9½ miles south-eastward, the coast is steep and rocky.

- 50 *Chart 2193, plan of Tabukan road.*

Anchorage may be obtained, in depths of from 14 to 19 fathoms (25^m6 to 34^m7) off Taboekan (Tabukan) village, situated about three-quarters of a mile southward of Tanjong Peliang, but the roadstead is open from north, through east, to south-east. Vessels should anchor

Chart 2193, plan of Tabukan road.

with the flagstaff bearing about 236° . The depths of less than 30 fathoms (54^m9) decrease gradually towards the coast.

Chart 2193, plan of Peta bay.

Baai van Peta.—Light.—Beacons.—Buoys.—This bay, entered 5 between Tanjong Boehiase (Buhiase) and a point about 6 cables north-westward, should only be used by vessels not exceeding 390 feet (118^m9) in length. Peta village, at the head of the bay, is the principal settlement on the eastern side of Sangi. The beach here is steep.

A light is exhibited at the head of the bay, and two leading beacons, 10 each in the form of a cross, stand about $4\frac{1}{2}$ cables apart south-westward of the light structure, and in line bear 222° .

A white conical buoy is moored on the edge of the shore reef on the north-western side of the entrance and a black can buoy on the edge of 15 the shore reef on the south-eastern side.

Anchorage may be obtained, in a depth of about 13 fathoms (23^m8), with the islet situated close off the southern shore about 4 cables west-south-westward of Tanjong Boehiase bearing 118° and about 130 feet (39^m6) south-eastward of the leading line. A stern hawser should be taken to the shore. Local knowledge is necessary for a vessel over 20 200 feet (61^m0) in length.

The limit of the roadstead is the arc of an imaginary circle with a radius of 820 feet (250^m0), and the light-structure as centre.

Cargo can be worked at all times.

Chart 2575.

Coast.—Anchorages.—Good anchorage may be obtained by vessels with local knowledge in Baai van Sensong, entered between Tanjong Telawai, about one mile south-south-eastward of Tanjong Boehiase (*Lat.* $3^{\circ} 39' N.$, *Long.* $125^{\circ} 34' E.$), and Tanjong Pananoaleng, about $1\frac{1}{4}$ miles farther in the same direction. The shores are fringed by 30 a reef, which makes landing difficult.

Sarahoengoe, a rock above water, lies on a reef about one mile southward of Tanjong Lehe, situated about one mile south-south-eastward of Tanjong Pananoaleng, and about half a mile offshore.

Anchorage may be obtained by vessels with local knowledge, in 35 depths of from 30 to 36 fathoms (54^m9 to 65^m8), in Baai van Talengan, entered about 2 miles south-south-westward of Tanjong Lehe. The sea is always calm here. Talengan village, situated in the north-western part of the bay, is difficult to distinguish. Mioeloe village is situated in the south-western part. Landing is difficult owing to the mangroves, 40 mud, and the extensive shore reef.

Chart 2193, plan of Kulur bay.

Anchorage may be obtained in Baai van Koeloe (Kulur), entered between Tanjong Wienta, about 3 miles southward of Tanjong Lehe, and Tanjong Pako, about half a mile east-south-eastward. Koeloe 45 village stands at the head of the bay. Foul ground extends about 6 cables from the head of the bay.

Chart 2193, plan of Menalu road.

Baie van Menaloe.—Dangers.—This bay is entered between Tanjong Pako and Batu Wingkong, an islet, 421 feet (128^m3) high, 50 about $3\frac{1}{4}$ miles east-south-eastward. The anchorage is approached on either side of Tehang, an island lying about 2 miles eastward of Tanjong Pako. The navigable channel between Tehang and Batu Wingkong is about half a mile wide between the reefs on either side, with a least

Chart 2193, plan of Menalu road.

depth of $4\frac{1}{2}$ fathoms (8^m7) in the middle. During the northerly monsoon there is a heavy swell in this channel, but at the anchorage it is nearly always calm.

- 5 Batu Malitehang (Maletahan) lies near the southern extremity of a detached reef which dries, about 9 cables southward of the southern extremity of Tehang.

In the north-western approach to the bay there is a $4\frac{1}{2}$ -fathom (7^m8) patch lying about 4 cables north-north-westward of Tanjong Kembono, situated $1\frac{1}{2}$ miles south-eastward of Tanjong Pako; and a rock,
10 awash, which is usually marked by breakers, lies about 3 cables eastward of Tanjong Kembono.

A vessel should enter the bay with Batu Malitehang in line with a hill, 490 feet (149^m3) high, close within the south-western shore of the
15 bay, bearing 213° , which leads through the entrance in a least depth of 46 feet (14^m0). A greater depth may be obtained by keeping the front mark open north-westward of the hill.

Anchorage may be obtained, in depths of from 22 to 27 fathoms (40^m2 to 49^m4), with the 490-foot (149^m3) hill bearing 180° , and a hill,
20 267 feet (81^m4) high, situated about $6\frac{1}{2}$ cables north-westward, 261° . Working cargo is difficult on account of the sloping beach.

Chart 2575.

Coast.—Between Tanjong Mahema, the northern point of Lebessan, and Tanjong Poengowatoe (page 34) the coast is high and rocky.
25 There are several deep inlets, but only in Baai van Ngalipaeng, on the southern side of the island, can anchorage be obtained. Dane or Baneh, a steep rocky islet, with a narrow fringing reef, lies close off the coast of Sangi about $1\frac{1}{2}$ miles southward of Tanjong Behang; the passage between them is available for small vessels with local know-
30 ledge except at very low tides. Lenggis, an islet, 359 feet (109^m4) high, lies about half a mile offshore, in the eastern approach to Baai van Ngalipaeng.

A vessel with local knowledge may obtain anchorage off Saloerang (Saluran) village, about 3 miles southward of Tanjong Mahema
35 (page 34), in a depth of about 30 fathoms (54^m9), with the white rocks northward of Beng Laoet (*see below*) bearing 069° , and the south-western extremity of Beng Darat, 124° . During the northerly monsoon landing is difficult owing to the shore reef which dries.

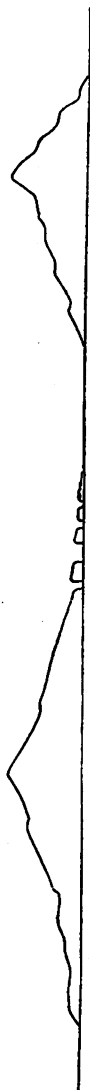
Off-lying islands.—Beng Darat, 441 feet (134^m4) high, lies about
40 $1\frac{1}{2}$ miles north-eastward of Tanjong Behang (*Lat.* $3^\circ 28' N.$, *Long.* $125^\circ 41' E.$), which is situated about $4\frac{1}{2}$ miles southward of Tanjong Mahema. The island is fringed by a coral reef, on the outer edge of which, about half a mile southward and south-westward of the southern extremity, there are two $3\frac{1}{2}$ -fathom (5^m9) patches. There is a shoal,
45 with a depth of $7\frac{1}{2}$ fathoms (13^m7), in the middle of the passage between the island and the coast of Sangi, marked by whirlpools. The summit of Batu Wingkong in line with the eastern extremity of Lebessan, bearing 346° , leads westward of these dangers. A tidal stream with a rate of 3 knots, has been observed during spring tides in this passage;
50 the stream sets northward during the rising tide and southward during the falling tide, the latter being the stronger.

Beng Laoet (Beng Laut), a hilly islet, lies about one mile east-north-eastward of Beng Darat, with a clear and deep channel between the reefs, which are marked by discoloration, on either side. Several bare

To face page 37.



Auoc
bearing 028°, 40 miles



Kalama,
bearing 068°, 22 miles.

Kakabitang,
bearing 079°, 26 miles.



Islands southward of Kakabitang.

Three views of Sangi eilanden from west-south-westward.
(Original dated 1931.)

Chart 2575.

rocks lie within about one mile northward and close eastward of Beng Laoet.

Chart 2193, plan of Ngalipaeng bay.

Baai van Ngalipaeng.—Anchorage may be obtained in this bay, during the North-west monsoon, in a depth of 47 fathoms (86^{m0}). Ngalipaeng village is situated at the head of the bay, off which there is a wide shore reef.

Chart 2575.

Karakitang eilanden.—These islands consist of the group lying between Sangi and Siao (Siau), about 35 miles south-south-westward. Only Kalama, Kahakitang and Para are inhabited.

Kalama, the northernmost island of the group, lying about 10 miles south-westward of Tanjong Poengowatoe, is 1,189 feet (362^{m4}) high. (See view facing this page). Anchorage may be obtained off the village on the south-western side of Kalama, about 1½ cables offshore, in a depth of about 33 fathoms (60^{m4}), with the south-western extremity of the island bearing 331°, and the village, 000°. The coastal reef here extends about half a cable offshore; there may be a strong stream at the anchorage.

Kahakitang (Karakitang), 818 feet (249^{m3}) high, lies 3½ miles south-eastward of Kalama. (See view facing this page). Anchorage may be obtained by vessels with local knowledge, in a depth of about 44 fathoms (80^{m5}), in Telok Behongang, on the northern side of Kahakitang. Behongang village is situated at the head of the bay, on the western side. A stone mole, with a wooden head and steps, at the village, with a depth of 6 feet (1^{m8}) alongside, affords a good landing place. The edges of the shore reef are plainly visible.

Mahengetang (*Lat.* 3° 09' N., *Long.* 125° 27' E.), 129 feet (39^{m3}) high, lies 3 miles south-westward of Kahakitang. Some rocks, 54 feet (16^{m5}) high, lie about 2½ cables westward of Mahengetang; it is reported that a column of water is sometimes thrown up from the sea in this vicinity, where there was an eruption in 1919.

Anchorage may be obtained by vessels with local knowledge, in a depth of 20 fathoms (36^{m6}), off the village on the south-western side of Mahengetang, with an islet covered with vegetation on the reef extending from the western extremity, bearing 339°, and the southern extremity of the island, 080°.

Siha, 336 feet (102^{m4}) high, Salengkere, 293 feet (89^{m3}), Para, 749 feet (228^{m6}), and Nitoe (Nitu), 198 feet (60^{m3}), lie in a group close together about 3 miles south-eastward of Mahengetang. A rock, which dries, lies about half a mile southward of the southern extremity of Para. The channel between Siha and Salengkere dries, and that between Salengkere and Para is only navigable by small craft with local knowledge. The channel between Para and Nitoe is deep and clear of dangers, but there is a strong stream in it.

A vessel with local knowledge may obtain anchorage off the village on the south-western extremity of Para, in a depth of 38 fathoms (69^{m5}), about 2 cables offshore, with a rock covered with vegetation close off the western extremity of the island in line with the summit of Salengkere, and the rocky point southward of the village, about 112°. The stream which sets between Para and Nitoe passes mainly westward of this anchorage.

Nenoeng (Nenung), an islet 162 feet (49^{m4}) high, lies about 10 miles

Chart 2575.

eastward of the southern extremity of Para. Some rocks, above water, lie within 3 cables northward and southward of the islet. A sunken rock lies nearly one mile south-south-eastward of Nenoeng, and a bank, 5 with a depth of 9 fathoms (16^m5), coral, lies about 4 miles south-westward of the islet; it is often marked by breakers and tide-rips.

Sanggaloehang, 260 feet (79^m2) high, with an islet, 250 feet (76^m2) high, lying on the same reef, close southward of it, lie about 7 miles 10 south-south-westward of Para. Bowondeke, 181 feet (55^m2) high, lies about 1½ miles westward of Sanggaloehang. A 2¼-fathom (5^m0) patch lies about half a mile north-westward of Sanggaloehang.

Siaoe.—Siaoe (Siau), known as Karang Etang by the natives, has a remarkable range of volcanic cones, the northern of which is Gunong 15 Api, or Beloeoe Awoe, an active volcano, 5,992 feet (1826^m4) high; the three cones southward of it are Tamata, which has a double peak, the higher of which has an elevation of 3,718 feet (1133^m3); Begangbalo, also with a double peak, and Tontonboelo, which is connected by a ridge close south-westward to Masio. The mountainous land slopes 20 gradually eastward and forms some rocky points northward and southward. Sinapati, a conspicuous ridge, 779 feet (237^m4) high, is situated on the western side of the island, about 3 miles south-westward of Gunong Api. Tanjong Pihise, the south-eastern point of the island, is low and covered with mangroves. See views facing pages 40 and 41. 25 The island is densely populated. Coconuts and nutmegs are cultivated.

Chart 2193, plan of Sawang and Ulu roads.

Reede Oeloe.—**Light.**—Reede Oeloe (Ulu road) is situated off Oeloe village, on the eastern side of Siaoe about 3 miles southward of 30 Gunong Api (*Lat.* 2° 48' N., *Long.* 125° 25' E.).

There is a pier at the village, from the head of which a light is exhibited.

Anchorage may be obtained, in a depth of 44 fathoms (80^m5), about 1½ cables offshore, with a conspicuous white pillar, about 3 cables 35 eastward of the light-structure, bearing 000°. The bottom is very steep here, and it is advisable to lay out a hawser to the shore. During heavy squalls there is a good berth, in a depth of 26 fathoms (47^m5), with the white pillar bearing 010°, and the flagstaff, 296°, without any hawser to the shore.

40 From the beginning of January to the middle of April, winds between north-east and east render the roadstead unsafe, so that it is better to anchor during that period, and also in the southerly monsoon, off Sawang village, about 3½ miles southward of Oeloe, where the bottom is not so steep.

45 *Chart 2575.*

Off-lying islands.—Pahepa, 703 feet (214^m3) high, with a conical summit, lies with Tanjong Pondang, its south-western extremity, nearly one mile south-eastward of Tanjong Pihise. The channel between them is deep and clear of dangers in the fairway; the reefs 50 extending from either side are well marked by discoloration. A stream with a maximum rate of 2½ knots has been observed in this channel, and whirlpools frequently occur. The only anchorage which is sheltered throughout the year is off the small village on the western side of Pahepa.

Chart 2575.

Goenatin, 916 feet (279^m2) high, is connected to the northern end of Pahepa by a reef, which dries. Boehias village is situated on the south-western side of the island, and on the northern side there is a small bay with a sandy beach. Batu Bolontohe, some rocks covered with vegetation, lie about 2½ cables northward of the northern extremity of Goenatin. 5

Mahoro, a steep, rocky, uninhabited island, 552 feet (168^m2) high, lies about half a mile eastward of the eastern extremity of Pahepa. A small rock lies close off the north-eastern and south-eastern points of the island. 10

As there is a coral reef with a least depth of 13 feet (4^m0) at the northern end of the channel between Pahepa and Mahoro, and strong streams set through it, vessels are advised not to use this channel. Masare and Kapoeliha are islets 247 and 231 feet (75^m3 and 70^m4) high, respectively, lying on a reef which extends about three-quarters of a mile northward from the eastern extremity of Pahepa. There is a low strip of land covered with coconut trees between the two high rocks of which Masare is formed.

Laweang, a steep islet, 198 feet (60^m3) high, lies about half a mile southward of the eastern extremity of Pahepa. A coral reef, with a depth of one foot (0^m3), lies about half a mile south-eastward of Laweang; with a heavy swell the rocks are awash. 20

Makalehi (*Lat. 2° 45' N., Long. 125° 10' E.*), an islet 746 feet (227^m4) high, and partly covered with vegetation, lies about 11 miles westward of the western extremity of Siaoe. A village of the same name is situated in a small bay on the south-western side of the islet; the bay is encumbered with reefs and dries. 25

Tahoelandang, Roeang and Pasige.—Tahoelandang (Tagu-landang), 15 miles southward of Siaoe, is 2,639 feet (804^m4) high, being the summit of a crater, which is broken on the northern side and forms Baai van Minangan. In the middle of this old crater there is an extinct volcano, which is very steep on all sides. The southern and eastern coasts are very steep; the coastal reef, which extends about three-quarters of a mile from Tanjong Lissa, the western extremity of the island, is only slightly marked by discoloration. The channel between the coastal reefs of Tahoelandang and Pasige, about 3½ miles westward, is deep and clear of dangers. Tahoelandang is inhabited. 35

Pasige is low, covered with mangroves, and uninhabited. The edge of the reef, which dries, which extends as much as 2½ miles north-eastward, is usually marked by breakers, even at high water. 40

Roeang (Ruang), which is separated from the south-western side of Tahoelandang by a channel about 5½ cables wide, is entirely occupied by Roeang Vulkaan, an active volcano, 2,396 feet (730^m3) high; the summit is on the eastern side of the crater, and is rendered very conspicuous on account of some steep rocks which are situated there. From a considerable distance the volcano appears like a mountain with a flat top and steep sides. The last great eruption occurred in 1904. The island is sparsely populated. A coral reef extends a short distance from Tanjong Lempate, the western extremity of the island, but elsewhere there is no coastal reef. See view facing page 41. 45

There is a reef, with a depth of 6 feet (1^m8), in the middle of the channel between Roeang and Tahoelandang, and as there is also a strong tidal stream vessels are recommended not to use it. The stream sets

Chart 2575.

south-eastward during the rising tide and north-eastward during the falling tide.

Anchorage.—Anchorage may be obtained by vessels with local knowledge off Minangan village, in Baai van Minangan, sheltered during the southerly monsoon and in the transition periods. The depths are great, but as there is little or no shore reef, the shore can be closely approached; squalls do not occur here.

A vessel with local knowledge may obtain anchorage off Haas village, close westward of Tanjong Toka, the southern extremity of Tahoelandang, in a depth of 26 fathoms (47^m5), about 2 cables offshore and half a cable from the coastal reef, with Tanjong Toka bearing 083°, and the south-western extremity of Tahoelandang, 299°. This anchorage is not sheltered and there may be a moderately strong tidal stream.

Chart 2193, plan of Buhias road.

Reede Boehias.—**Light.**—Reede Boehias (Buhias road) is situated off the south-western side of Tahoelandang.

A light (Lat. 2° 20' N., Long. 125° 24' E.) is exhibited from a white stone column standing on a conspicuous rock of white limestone close southward of Boehias village, about 6 cables north-north-westward of Tanjong Pehe, the south-western point of Tahoelandang.

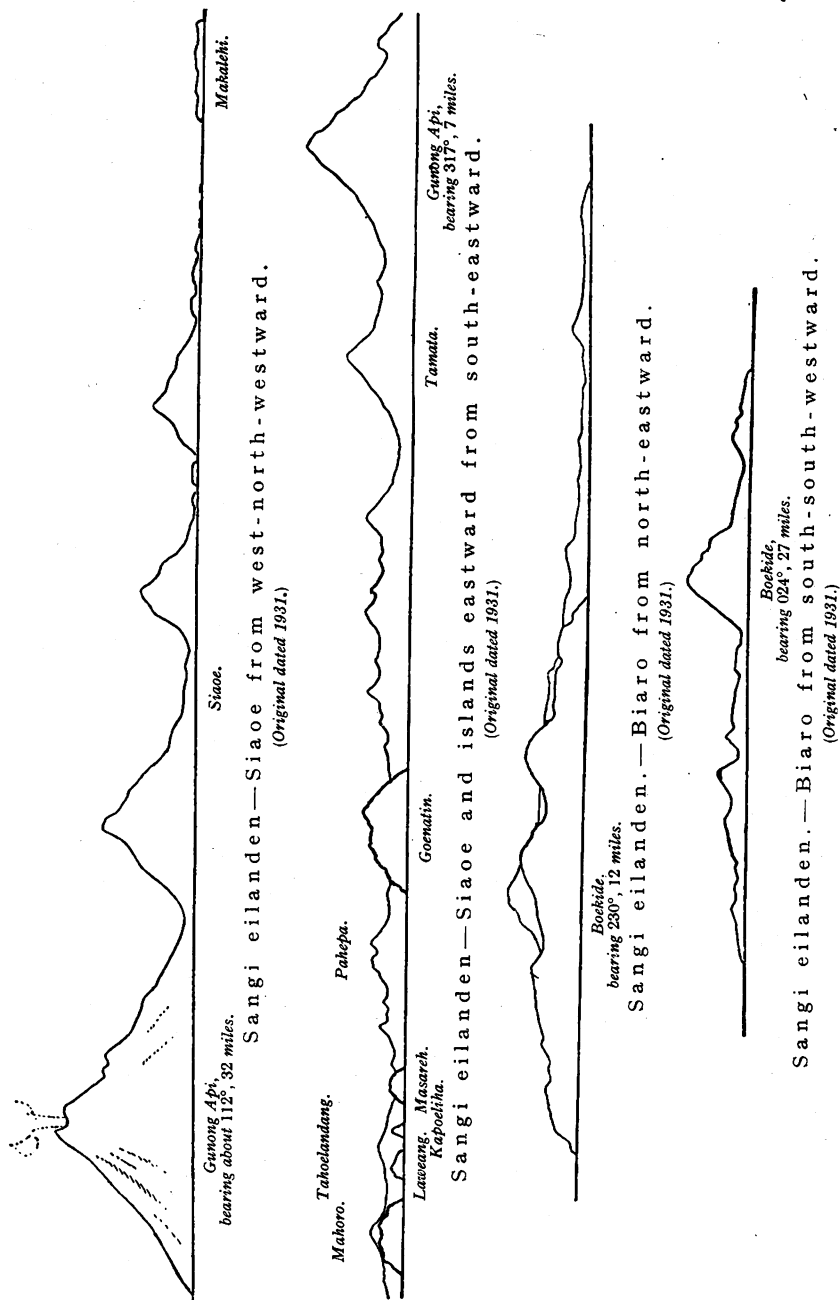
Anchorage may be obtained close off the coastal reef, which is narrow, in a depth of about 44 fathoms (80^m5). A short distance farther north-westward a vessel may obtain anchorage, in a depth of about 38 fathoms (69^m5), farther from the reef; the tidal stream which sets between Tahoelandang and Roeang is less felt here. With an unfavourable sea it is better to anchor off the northern side of Roeang, in depths of from 27 to 44 fathoms (49^m4 to 80^m5), laying out a hawser to the shore as the bottom rises steeply; there is a depth of over 16 fathoms (29^m3) about half a cable offshore.

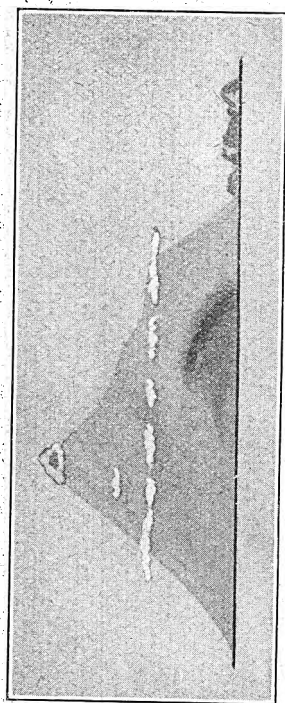
Charts 2193, plan of North bay, 940.

Biaro.—This island, 9½ miles southward of Roeang, has a conspicuous summit, named Boekide, 1,313 feet (400^m2) high, on its south-eastern side. (See views facing this page). Tanjong Poendoesi (West point), the north-western extremity of the island, is low, and off it there is a pillar-shaped rock, 28 feet (8^m5) high. This point should not be approached within 1½ miles, as there is a 3¼-fathom (5^m9) patch lying about 8 cables north-north-westward of the point, and a spit with a depth of 2 fathoms (3^m7), extends about half a mile north-westward from the steep rocky point situated about half a mile west-south-westward of Tanjong Poendoesi.

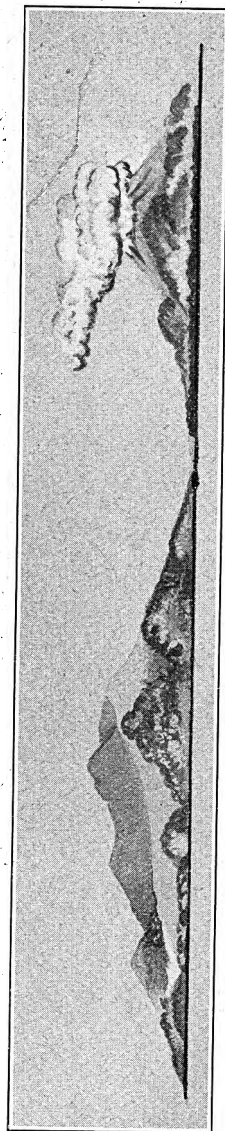
A pillar-shaped rock lies on the reef extending north-north-eastward from Tanjong Meoh (East point), the north-eastern extremity of the island. A ridge, with depths of less than 22 fathoms (40^m2), extends about 1½ miles northward from this point, and strong tidal streams may set over it. The eastern side of the island is steep, but there are some dangers lying close offshore, so that it is advisable not to approach it within a distance of about half a mile.

Anchorage may be obtained by vessels with local knowledge in North bay, on the northern side of Biaro, about 2½ cables from the shore reef. The only danger in the bay is a 2¾-fathom (5^m0) patch about 2 cables from the shore reef at the head. Caution should be exercised when approaching the anchorage, as the depths decrease





Sangi eilanden.—Siaoe.—Gunong Api, bearing 018° , 48 miles.
(Original dated 1916.)



Tahoelandang peak,
bearing 098° , 9 miles.
Sangi eilanden.—Tahoelandang group from westward.
(Original dated 1916.)

Rocang.

Pasige.



Nain.

Soodara.

Kalabal. Toempa.

Menado Toa,
bearing 137° .

Northern approach to Baai van Menado.
(Original dated 1929.)

Lolon.

Sopodan.

Charts 2193, plan of North bay, 940.

suddenly, and the shore reef is not visible at high water in a calm sea.

A vessel with local knowledge may obtain anchorage, in a depth of about 38 fathoms (69^m5), off Lamanggo (Biara) village, situated close southward of Tanjong Poendoesi, but which is not visible. She should approach the anchorage with Boekide bearing 139°, allowing for the tidal stream, which sets across this course. 5

NORTH-EASTERN END OF CELEBES.—Baai van Menado.

—Baai van Menado, entered between Tanjong Pisok, about 15 miles south-westward of Noordkaap (North Cape), the northern extremity of Celebes, and Tanjong Kalasei, 8 miles farther south-westward, has considerable depths, except close offshore. The coastal reef extends about 4 cables from Tanjong Pisok and is steep-to; it continues as a narrow fringe along the whole shore of the bay. See view facing this page. 15

Menado rivier, which has its origin in Meer van Tondano, 2,460 feet (749^m8) above sea level, flows out on the eastern side of the bay. The river is only navigable by small craft over a short distance, and is dangerous to enter under unfavourable conditions. 20

Chart 2194, plan of Menado road.

Reede Menado.—Lights.—Beacons.—Menado, the capital of the Minahasa district and the seat of the Residency, is situated at the mouth of Menado rivier. The European part, containing the New Amsterdam fort (*Lat. 1° 30' N., Long. 124° 50' E.*), an old stone building surrounded by a moat, is situated on the southern side of the river; the native quarters are mostly on the northern side. In 1936, the population of Menado was about 40,000. There is a basin for praus, with a depth of 3 feet (0^m9), on the southern side of the entrance to the river. A mole extends from both sides of the entrance to the river, from the head of each of which a light is exhibited. The landing place for boats is at the inner end of the basin, where there is a depth of 2 feet (0^m6). 30

The roadstead affords an insecure anchorage from November to the latter part of April; it is exposed to westerly winds, which are accompanied sometimes by heavy squalls. Vessels should be prepared to leave at short notice, and take shelter in Straat Bangka, or anchor off Kima village in Baai van Wori (page 42). 35

When communication with the shore is broken off, a blue flag will be displayed by day; at night a red light will be exhibited under the light at the head of the southern mole. 40

A light is exhibited, at an elevation of 39 feet (11^m9), from a white iron framework structure, 39 feet (11^m9) in height, situated on the beach about 3½ cables southward of the head of the southern mole.

A beacon, surmounted by a white ball, stands on the reef lying about 2 cables west-north-westward of Tanjong Tokabene, situated about 4½ cables southward of the light-structure on the beach. 45

Two leading beacons, each surmounted by a red ball, in line bearing 108°, are situated about three-quarters of a cable northward of the fort. Two leading beacons, each surmounted by a red diamond, in line bearing 108°, are situated on the southern side of the entrance to the river, eastward of the flagstaff. A beacon, surmounted by a red triangle, stands about 1½ cables northward of the entrance to the river. A beacon, surmounted by a white ball, marking the northern limit of the 50

Charts 2575, 943, 942a, 1263.

Chart 2194, plan of Menado road.

roadstead, is situated about $3\frac{1}{2}$ cables northward of the entrance to the river.

Mooring buoys.—There are a number of mooring buoys in the roadstead, the positions of which may best be seen on the chart. The sterns of vessels anchored in the roadstead are secured to them. The northernmost buoy is reserved for the Government vessel stationed at Menado.

At night, if previous intimation is given by wireless to the Harbour Master, a red light will be placed on one of the mooring buoys and also on the corresponding front leading beacon.

Harbour limits.—The roadstead is bounded by lines drawn in a 281° direction from the light-structure, situated about $3\frac{1}{2}$ cables southward of the entrance to Menado rivier, and from the beacon marking the northern limit of the roadstead; and by a straight line joining positions, on those lines, situated about $3\frac{1}{2}$ cables from the shore.

Wharf.—A wharf, with steps at the seaward end, is situated on the southern side of the entrance to the river; the wharf can be used from three hours before to three hours after high water.

Harbour facilities.—Fresh provisions are obtainable. Water can be delivered alongside by a tug with a capacity of 18 tons. Boiler water can be obtained alongside the wharf.

There is a hospital for Europeans with 100 beds. All vessels are inspected on arrival before anyone may land. The climate is healthy. Menado is connected to the general telegraph system.

There is a crane with a lifting capacity of one ton.

Meteorological table.—See page 23.

Chart 940.

Coast.—The coast between Tanjong Pisok (*Lat. $1^\circ 34' N.$, Long. $124^\circ 48' E.$*) and Noordkaap is low and mostly fringed by a narrow reef except in the bight about $2\frac{1}{2}$ miles south-westward of Noordkaap, which is almost entirely filled by it. Toempa (Tumpa), a mountain, 2,139 feet (652^m0) high, lies about $2\frac{3}{4}$ miles eastward of Tanjong Pisok.

Kima village is situated at the head of Baai van Wori, entered about 4 miles north-eastward of Tanjong Pisok. Three reefs, with a depth of 2 fathoms (3^m7) on the north-easternmost and shoalest, lie off the entrance to this bay, and are only slightly marked by discoloration. Two unofficial beacons, surmounted by white boards, with red triangles, stand on the northern side of the bay, and in line, bearing 111° , lead in between the two south-western reefs.

Vessels with local knowledge may obtain anchorage off Kima village, in a depth of about 16 fathoms (29^m3), with a hawser to the shore, sheltered from north-westerly winds by the reefs. Landing can be effected here when this is impracticable at Menado. There is also anchorage outside the reefs, in a depth of 23 fathoms (42^m1), on the alignment of the beacons. Wori village stands on the southern shore of the bay.

50 Chart 2194, plan of Kora Kora bay.

Kora Kora baai, entered about one mile south-south-westward of Noordkaap, affords well sheltered anchorage, in a depth of about 16 fathoms (29^m3). A reef, which dries, extends from both entrance points, leaving a passage about half a cable wide between.

Charts 2575, 943, 942a, 1263.

Chart 940.

Off-lying islands.—Boenakeng (Bunakeng), about 2 miles north-north-westward of Tanjong Pisok, is low, but rises gradually to a round-topped hill, 358 feet (109^m1) high, in its western part. The island is fringed by a coral reef, which is steep-to, extending about 6 cables southward from its south-western extremity, and westward from its southern point. 5

Menado Toea (Menado Tua), about 1½ miles westward of Boenakeng, rises steeply in the form of a truncated cone to an elevation of 2,694 feet (821^m2), and has the appearance of a volcano. (*See* view facing 10 page 41). It is fringed by a reef which extends 3 cables from its northern side, but is narrow elsewhere. Siladeng, about 1½ miles eastward of the north-eastern extremity of Boenakeng, is low; there is a white sand beach on its eastern side.

Manterawoe, about 4½ miles north-eastward of Menado Toea, is a flat 15 coral island covered with trees, and fringed by a reef which extends about 1½ miles from its northern side. Nain, about 2½ miles north-eastward of Manterawoe, appears saddle-shaped from eastward or westward, the northern summit, which has an elevation of 627 feet (191^m1), being the higher. The island lies in the middle of a coral reef 20 which is steep-to. Nain Kechil (*Lat.* 1° 47' N., *Long.* 124° 48' E.), 112 feet (34^m1) high, lies on the same reef about half a mile eastward of Nain.

All the above mentioned islands are planted with coconut trees. The channels between these islands are deep and clear of dangers in the 25 fairway.

STRAAT BANGKA. — Dangers. — Light. — Straat Bangka (Banka strait) lies between the north-eastern coast of Celebes between Noordkaap and Tanjong Poeisan (Puisan), 12 miles east-south-eastward, on the south, and a group of islands, of which Bangka, Talisei and 30 Gangga (Ganga) are the principal, on the north. The depths throughout the strait are irregular, the water is so clear that the bottom can be seen in depths of from 8 to 10 fathoms (14^m6 to 18^m3) in a calm sea. The strait is available for vessels of any draught by following the direc- 35 tions given on page 46.

Noordkaap or Tanjong Torawitan is wedge-shaped when seen from eastward or westward, and rises gradually to the hilly land within. It is fringed by a coral reef, which extends about a quarter of a cable offshore and is steep-to, and on its eastern side there is a beach of white coral sand. Tanjong Bohoi, about 3 miles south-eastward of Noord- 40 kaap, is a low rounded point, fringed by a reef, which dries.

Lehaga, an islet 106 feet (32^m3) high, lies on the northern side of the strait about 2 miles north-north-eastward of Tanjong Bohoi. Gangga, with its southern end about three-quarters of a mile eastward of Lehaga, is 292 feet (89^m0) high at its southern end; its eastern side is 45 steep-to, but its western side is fringed by a reef. A 5-fathom (9^m1) patch lies about 4 cables off the south-eastern side of Gangga. Tindila is an islet separated from the northern extremity of Gangga by a narrow channel only available for boats. The northern part of the islet is rocky, and the southern part terminates in a white sandy beach. 50 A reef extends about 4 cables south-westward from the western side of the islet.

Talisei, separated from the northern extremity of Tindila by a deep

Charts 2575, 943, 942a, 1263.

Chart 940.

channel about 4 cables wide, is a densely wooded island, with a ridge which runs almost throughout its length, with its summit, 1,175 feet (358^m2) high near the middle; the southern end of the island is low.

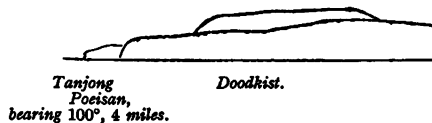
- 5 Tanjong Aroes (Arus), the northern extremity, is a bold cliff with some large rocks at its base. Along the western side of the island the fringing reef dries out to about one cable, widening to about 2½ cables off the south-western extremity.

- A light is exhibited, at an elevation of 352 feet (107^m3), from a white iron framework structure, 65 feet (19^m8) high, on Tanjong Aroes.

- All the dangers with depths of less than 5 fathoms (9^m1) lie southward of a line joining Noordkaap and Tanjong Poeisan, which are described with the anchorage in Reede Likoepang on page 45. There are a number of shoals with depths of from 5 to 6 fathoms (9^m1 to 11^m0) in the fairway of the strait, the positions of which may best be seen on the chart.

- Bangka (Banka), the easternmost of the islands, the northern side on Straat Bangka, is hilly and densely wooded, the summit, with an elevation of 1,139 feet (347^m2), being on the eastern side. Tanjong Sahaong (*Lat. 1° 44' N., Long. 125° 09' E.*), the southern extremity, is cliffy, and rises to a conical hill, 277 feet (84^m4) high. Sahaong, an islet, and several rocks above water, lie on a reef extending southward from a tongue of land projecting eastward about one mile north-eastward of Tanjong Sahaong, which forms the southern side of Djiko (Jiko) Sago. Tanjong Batoe Gosoh, the eastern extremity of Bangka, rises to a sharp conical hill, 263 feet (80^m2) high; some pointed rocks, from 15 to 20 feet (4^m6 to 6^m1) high, lie close off this point, and there are also some rocks above water close off Tanjong Toto, about 1½ miles southward. The northern point of Bangka is low and fringed by a coral reef which extends about 2 cables north-westward, with Batu Kapal, 11 feet (3^m4) high, on its extremity. The tidal streams are sometimes strong off this point.

- Tanjong Mokotamba, 1½ miles westward of the northern extremity of Tanjong Poeisan, is a steep and cliffy point wooded to the water's edge, with large boulders extending about one cable northward from it, and a shoal about one cable farther. Tanjong Poeisan is a high rocky point, rendered conspicuous by a black rock, 15 feet (4^m6) high, in the



North-eastern extremity of Celebes.

(Original dated 1931.)

- form of a pyramid, connected to it. The land rises steeply within the point to Doodkist, a tableland, 972 feet (296^m3) high, and densely wooded, and can easily be identified by its coffin-like aspect.

- Tidal streams.**—The tidal streams in Straat Bangka are semi-diurnal, and attain a rate of from 2 to 3 knots at spring tides. The stream sets westward during the rising tide and eastward during the falling tide. The west-going stream, striking against Tanjong Bohoi, is partly deflected northward, one part setting between Gangga and

Charts 2575, 943, 942a, 1263.

Chart 940.

Lehaga. The east-going stream is joined by a south-east-going stream from between the islands on the northern side of the strait, principally from along the western side of Bangka.

With an east-going stream in the strait there is a strong southerly set between the northern extremities of Talisei and Bangka. With a west-going stream in the strait the stream sets north-westward and northward between Talisei and Bangka, as well as along the western coasts of Gangga, Tindila and Talisei; these last two streams unite about 3 miles north-westward of Tanjong Aroes, causing heavy tide-rips and eddies.

Chart 930, plan of Likupang road.

Reede Likoepang.—Dangers.—Reede Likoepang (Likupang), off Likoepang village, about 4 miles south-south-eastward of Tanjong Bohoi, is well sheltered during the South-east monsoon. The village stands on the western side of the mouth of a rivulet.

Tamperong is a low island lying in a bight on the western side of the roadstead, about $1\frac{1}{2}$ miles southward of Tanjong Bohoi. The reefs in this bight are well marked by discoloration.

A 3-fathom (5^m5) patch lies about 2 miles eastward of the northern extremity of Tamperong. Korrier rif, with a depth of 3 fathoms (5^m5), white coral sand, stones and shells, lies about 2 miles farther eastward and about $1\frac{1}{2}$ miles from the southern shore; it is usually marked by tide-rips. A spit, with depths of less than 5 fathoms (9^m1), extends about $6\frac{1}{2}$ cables southward from this reef.

Good anchorage may be obtained, in depths of from 7 to 9 fathoms (12^m3 to 16^m5), with the village bearing 200° and Tanjong Bohoi (Lat. $1^\circ 44' N.$, Long. $125^\circ 01' E.$), 314° . Small vessels can anchor closer in, but care must be taken that the pyramid rock close off the point about $3\frac{1}{2}$ miles westward of Tanjong Poisan is not shut in by the first point eastward of Likoepang, as there is foul ground inside it.

Chart 930, plan of Talisei road.

Reede Talisei.—Light.—Dangers.—This roadstead is situated off the south-eastern side of Talisei. Close offshore on the northern side of the roadstead is Kinabahoetan, a low wooded island, with a hill about 60 feet (18^m3) high on its south-eastern side. There are depths of over 5 fathoms (9^m1) in the channel between Kinabahoetan and Bangka. There is a narrow channel, with depths of 3 fathoms (5^m5), available only for small craft with local knowledge, between Kinabahoetan and Talisei.

There is a stone mole at Talisei, from the head of which a light is exhibited, at an elevation of 17 feet (5^m2), from a wooden post. Boats can lie alongside at any state of the tide.

A black can buoy is moored about half a cable south-eastward of the head of the pier.

A $4\frac{1}{2}$ -fathom (8^m2) patch lies about 3 cables south-eastward of the head of the pier.

A detached reef, with a depth of 5 feet (1^m5), lies about $3\frac{1}{2}$ cables westward of the south-western extremity of Kinabahoetan.

Anchorage may be obtained, in a depth of about 10 fathoms (18^m3), on the prolongation of the mole, and the western extremity of Kinabahoetan bearing 047° . Small vessels can anchor between the head of the mole and the $4\frac{1}{2}$ -fathom (8^m2) patch, lying about half a cable south-eastward, with a stern fast to the mole.

Chart 930, plan of Talisei road.

There is a Government coal depot at Talisei, and coal can be loaded at the rate of about 200 tons a day.

Chart 940.

- 5 **Directions for Straat Bangka.**—A vessel of deep draught from westward may pass about a quarter of a mile northward of Noordkaap and then keep that point in line astern with the southern extremity of Nain, bearing 277° , which leads close northward of a 5-fathom (9^m1) patch, about $2\frac{1}{2}$ miles westward of Tanjong Sahaong, and close south-
10 ward of that point.

COAST.—The coast between Tanjong Poeisan and the northern entrance of Straat Lembeh, about 12 miles south-south-eastward, is steep-to, and there is a heavy surf with a northerly or north-easterly swell.

- 15 **Batu Pandita**, close southward of Tanjong Poeisan, is 27 feet (8^m2) high, with a white conical summit. **Kalinaon**, about 3 miles south-south-westward of Batu Pandita, is an islet, 247 feet (75^m3) high, covered with vegetation, and joined to the coast by a reef. **Mogogimboen** is a conical rocky islet, 160 feet (48^m8) high, and covered with
20 vegetation, about 2 miles southward of Kalinaon and about three-quarters of a mile offshore. A reef, with two rocks above water on it, extends from the northern side of the islet, and breaks heavily with the slightest sea or swell.

- Anchorage may be obtained in the bay westward of Mogogimboen, 25 sheltered from southerly winds, in a depth of 20 fathoms (36^m6), with Mogogimboen bearing 093° , and Batu Pandita, 022° .

- Batu Angoes (Angus)** is a volcano, 3,718 feet (1133^m3) high, about $3\frac{1}{2}$ miles westward of the western entrance point of the northern end of Straat Lembeh; and on the south-eastern slope of the volcano is
30 another crater, named **Batu Angoes (Angus) Baroe**, in the shape of a truncated cone, and not so densely wooded as the adjacent mountains. **Soedara (Sudara)**, about $2\frac{1}{2}$ miles south-westward of Batu Angoes, has a double peak, the higher and western of which is 4,475 feet (1364^m0) high. **Kalabat** is a conspicuous cone, 6,631 feet (2021^m1) high, about
35 8 miles westward of Soedara.

- Lembeh.**—Lembeh is an uninhabited, densely wooded island, lying with its northern extremity about 11 miles south-eastward of Tanjong Poeisan. The northern extremity is a wedge-shaped rock, about
40 200 feet (61^m0) high; close northward of it is **Batu Kapal**, 82 feet (25^m0) high, and white from guano; rocks extend 2 cables farther northward, the outermost being about 6 feet (1^m8) high. These rocks may be rounded at a distance of about half a mile, but there is usually a strong tide race with whirlpools in the vicinity.

- The east coast is rocky and steep-to, and can be closely approached; 45 some detached rocks, on which there is usually surf, lie close off this coast. The south coast is fringed by a fairly wide coral reef, which dries, and is indented by several small inlets. **Soesoelina (Susulina)**, about 120 feet (36^m6) high, is a rock lying close off the south-eastern extremity of the island, and **Pulau Doea (Dua)**, with two peaks, 309 feet
50 (94^m2) high, lies about $2\frac{1}{2}$ miles west-south-westward of Soesoelina (*Lat. $1^\circ 25' N.$, Long. $125^\circ 15' E.$*).

The south-western extremity of Lembeh is formed by a narrow hilly tongue of land, about 7 cables westward of which there is a small

Charts 2575, 943, 942a, 1263.

Chart 940.

sandy islet, with a 15-foot (4^m6) patch lying about 3 cables northward of it.

Charts 2194, plan of Lembah strait, 940.

Straat Lembah.—Dangers.—Straat Lembah, separating Lembah 5 from the main island, is narrow and somewhat intricate; in the middle are two islets fringed by reefs, with a channel on either side, the north-western being the better as it is nearly straight and the reefs are usually plainly visible. A shoal, with a depth of 2½ fathoms (4^m6), not always 10 marked by discoloration, lies in the middle of the channel about half a mile north-eastward of the north-eastern islet. A shoal, with a depth of 4½ fathoms (8^m2), lies on the north-western side of the fairway, about 4 cables west-south-westward of the south-western islet.

Two shoals, with depths of about 5 feet (1^m5), lie nearly half a mile offshore south-westward of Tanjong Merah, the western entrance point 15 of the south-western end of the strait, so vessels should give this part of the coast a good berth when proceeding to and from Kema. Girian village stands on the Celebes shore, about 2 miles north-eastward of Tanjong Merah, and a bank of sand and mud, which is steep-to, extends about 3 cables offshore here. 20

The tidal streams in Straat Lembah are semi-diurnal, and in the narrowest part attain a rate of from 3 to 4 knots; the stream sets northward with the rising tide, and southward with the falling tide. Southward of the islets in the middle of the strait there is little tidal stream off the Lembah shore, and sometimes there is an 25 eddy.

Anchorage may be obtained off the western side of the north-eastern entrance of the strait, in a depth of 20 fathoms (36^m6), with Batu Kapal bearing 056°, and about 2 cables northward of two pillar rocks, about 40 feet (12^m2) high, lying close off the Celebes shore. 30

Chart 930, plan of Kema road.

Reede Kema.—Light.—This roadstead lies off Kema village, about 3½ miles south-westward of Tanjong Merah. Kema village stands on a plain at the foot of Kalabat, and can be identified by the numerous coconut trees along the beach, but it is not easily seen from seaward, 35 especially from southward, as the houses are hidden by some high rocks southward of the roadstead. The most conspicuous objects are the light-structure, the mosque, the rocky point half a mile southward of the light-structure, and Batu Nonna, a rock on the coastal reef, which dries, extending from this point. 40

A light (*Lat.* 1° 21' N., *Long.* 125° 05' E.) is exhibited, at an elevation of 24 feet (7^m3), from a white post, on the beach at Kema.

A shoal, with a depth of 5½ fathoms (10^m1), lies about 4½ cables east-north-eastward of Batu Nonna, and a reef, with a depth of 2½ fathoms (5^m0), lies on the northern side of the roadstead, about 3 cables offshore, 45 nearly 1½ miles north-eastward of the light-structure.

Good anchorage may be obtained at all times, in depths of from 5 to 11 fathoms (9^m1 to 20^m1); vessels anchoring in a depth of 6 fathoms (11^m0) will lie nearly 3 cables offshore. Landing can always be effected on the southern side of the roadstead, even when this is 50 impracticable elsewhere owing to the heavy swell; under favourable conditions the most convenient landing place is by the light-structure.

Chart 2575.

Current.—It has been recorded that between Lembah and the

Charts 2575, 943, 942a, 1263.

Chart 2575.

Benten an eilanden, about 30 miles south-westward, the current sets northward along the coast, at the rate of from one to $1\frac{1}{2}$ knots.

Rainfall.—See page 25.

- 5 **MOLUCCA SEA.**—This sea, which separates the north-eastern end of Celebes from the western side of Halmahera, is bounded on the south by Soela eilanden, and is the principal passage for steam vessels proceeding between the Celebes, Ceram, Banda and Arafura seas.

Local weather.—See pages 14-15.

- 10 **Tidal streams.**—**Current.**—Tidal streams are only experienced in coastal waters, details of which are given with the description of the coast. During the southerly monsoon the stream in the open sea sets north-north-east, at a usual rate of about half a knot, but may attain 2 knots, and during the northerly monsoon it sets east-south-east at
15 a rate of from three-quarters of a knot to 2 knots.

For remarks on Current, see page 4.

- Islands and dangers.**—Except for a few reefs in the immediate vicinity of the various islands no isolated dangers have been found in the Molucca sea. The danger farthest offshore is Wolfsklip (Wolf rock),
20 described on page 59.

- Majoe (Mayo), situated about midway between the north-eastern end of Celebes and Halmahera, attains an elevation of 1,352 feet (412^m1) in the middle and slopes gradually to the coast, which is steep-to. During the southerly monsoon, anchorage may be obtained, in a depth of about
25 22 fathoms (40^m2), off the northern side of the island. There is a village on the western extremity of the island, and the best landing place is eastward of it.

- Tifore, about 23 miles south-westward of Majoe, is 598 feet (182^m3) high, with rocky coasts. Goereda (Gureda), an islet, 319 feet (97^m2)
30 high, which is connected to the northern side of Tifore by a reef which dries, is conspicuous. A reef, with a depth of 8 feet (2^m4), marked by discoloration, lies about 2 cables off the middle of the south-western side of Tifore. There is a village on the north-eastern coast of the island.

- 35 **Current.**—See page 5.

Chart 2788.

- HALMAHERA.**—This island is included in the Ternate Residency, and is divided into four provinces:—Djailolo, Tidore, Weda and Tobelo. The sparse scattered population are of the Alfoeren and
40 Papuan types, and to a great extent they dwell on the coast. The northern part of the island is the most populated. Coconut culture and forest produce are the principal means of livelihood; fishing is only carried on in the rivers.

- Halmahera, though the least important, is by far the largest island
45 of the Noordelijke Molukken, and in general outline is very similar to Celebes, consisting of four long narrow peninsulas, with deep intervening gulfs; it lies at the extreme north of the whole group.

- The northern peninsula consists mainly of a mountain range, but its peaks are difficult to identify from a distance, the highest being Silo,
50 which attains an elevation of 3,197 feet (974^m5), about 18 miles south-south-westward of Tanjong Bisoa (*Lat.* $2^{\circ} 13' N.$, *Long.* $127^{\circ} 57' E.$), the northern extremity of the island. Posawani, 2,662 feet (811^m4)

Charts 943, 942a, 1263.

1,081 ft.
↓

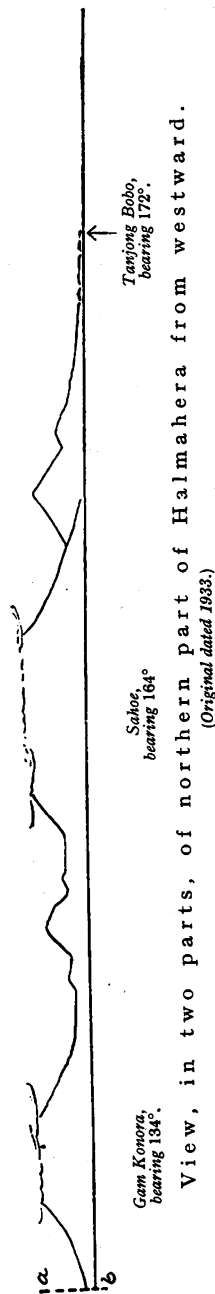
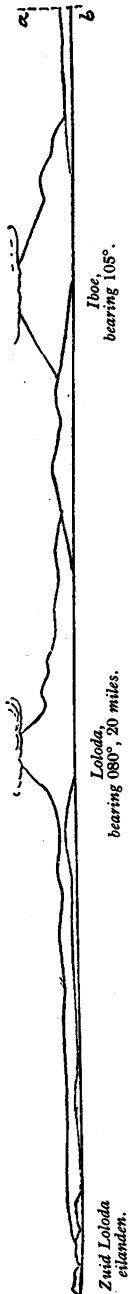
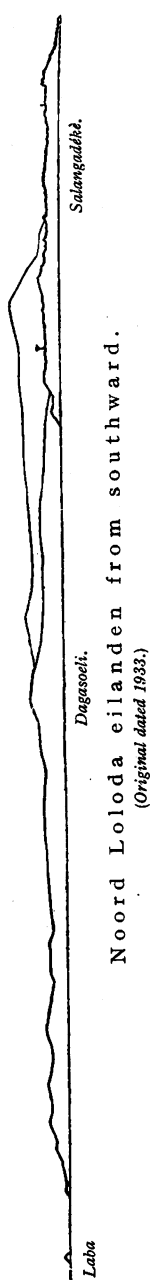
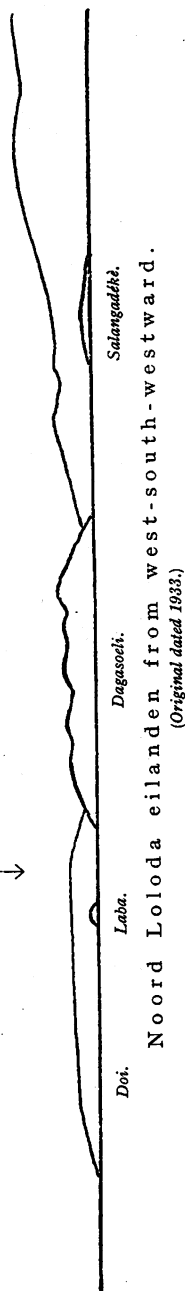


Chart 2788.

high, at the northern end of the range, is only conspicuous from northward and southward.

The aspect of the other peninsulas is described with their coasts.

Climate.—The climate on the east coast of Halmahera is such as might be expected along a steep high coast, which nowhere has extensive marshes or mudbanks; it is fresh and healthy.

Chart 2786, plan of North Loloda islands.

Noord Loloda eilanden.—These islands, consisting of Doi, Toeakara (Tuakara), Dagasoeli, and Salangadéke, lie westward of the northern end of Halmahera, and are inhabited. (See views facing this page). Doi, the northernmost, lying 8 miles westward of Tanjong Bisoa, is 1,081 feet (329^m5) high. Dehereté is a group of islets lying about half a mile off the north-western side of Doi. Dama village stands at the head of a small bight on the south-eastern side of Doi, where anchorage may be obtained by vessels with local knowledge, in a depth of about 33 fathoms (60^m4). A reef, with a depth of 10 feet (3^m0) at its outer end, extends about 2½ cables from the western side of the bight.

Dagasoeli lies about 2 miles south-south-westward of Doi, with Toeakara about midway between them. Laba or Padosa is an islet lying about three-quarters of a mile north-westward of Tanjong Goerama (Gurama), the western point of Dagasoeli, and a 16-foot (4^m9) patch lies nearly one mile east-north-eastward of the same point.

Salangadéke, on the summit of which there is a small conspicuous wood, is the southernmost island of the group. It is fringed by a drying reef, marked by discoloration, on the northern extremity of which is Tomako ma fatoe, a conspicuous rock, covered with vegetation, lying about three-quarters of a mile from the northern extremity of the island. Close within the southern extremity of the reef, which extends about 1½ miles from the southern extremity of the island, is Toco Toco (Tuo Tuo), a rock above water, and several others, all covered with vegetation.

The channels between the principal islands of the group are clear of dangers in the fairway, except for the 16-foot (4^m9) patch in the middle of the western end of the channel between Toeakara and Dagasoeli.

Chart 2788.

WESTERN SIDE OF HALMAHERA.—Coast.—Tanjong Bisoa slopes gradually from a mountain, 1,228 feet (374^m3) high, about 3½ miles southward. From a distance the mountains at the northern end of the peninsula afford less definite landmarks than they do farther south. The coast between Tanjong Bisoa and Tanjong Roeba Roeba, the northern entrance point of Loloda baai, about 39 miles south-south-westward, is inhospitable and sparsely inhabited. Bakoele, 1,334 feet (406^m6) high, lies close within the coast about 9 miles north-north-eastward of Tanjong Roeba Roeba (Lat. 1° 43' N., Long. 127° 33' E.), and another mountain, 1,074 feet (327^m4) high, lies about 2 miles farther north-north-eastward. A range of mountains, visible from between west and north-west, extends along the east coast of the peninsula southward of Bocht van Galela (page 74).

Between the points, which are mostly steep spurs from the mountains, there are narrow sandy beaches, with villages, off which anchorage can usually be obtained by vessels with local knowledge. Landing, however, is difficult. The coast can be followed safely at a short distance,

Chart 2788.

but vessels should keep outside the off-lying islets. Vessels with local knowledge may safely pass inside Soelana (Sulana) and Gorolama islets, lying about one mile offshore westward of Bakoeleoe.

- 5 Small vessels with local knowledge may obtain a temporary anchorage, in calm weather, in a depth of $3\frac{1}{4}$ fathoms (5^m9), off Asimiro village, about 19 miles south-westward of Tanjong Bisoa. A safe anchorage may be obtained, in a depth of 16 fathoms (29^m3), by vessels with local knowledge, between Diti, a coral islet, thickly covered with
10 vegetation, situated about $2\frac{1}{4}$ cables offshore and $2\frac{3}{4}$ miles south-westward of Asimiro village; this islet has a hillock close within its north-eastern and western extremities. Between Diti and Zuid Loloda eilanden, about 18 miles south-westward, the only good shelter for small vessels is in Telok Baratakoe, about 6 miles south-westward of
15 Diti, in a depth of 41 fathoms (75^m0), behind a drying tongue of reef, on which are the Baratakoe rotsen, which extend half a mile north-westward from the southern entrance point. Baratakoe village is situated here.

Chart 2786, plan of South Loloda islands.

- 20 **Loloda baai.**—This bay is fronted by the Zuid Loloda eilanden, which consist of Kahatola, 739 feet (225^m2) high, Sidanga, and Adoei (Adui), and several islets, the fringing drying reefs of which are marked by discoloration. The bay is encumbered with dangers, which are less well marked by discoloration in the inner part than they are in the
25 outer part.

- The double peak of Adoei, when seen from seaward from between Kahatola and Sidanga, appears conical. The outer coasts of Kahatola and Sidanga are mostly steep-to. Moré Porotjo (Porocho), a rock, 332 feet (101^m2) high, close off the north-eastern side of Kahatola, is
30 conspicuous from north-north-westward. The islands are uninhabited.

- Anchorage may be obtained between Doea Seta (Dua Seta), a rocky islet covered with coconut trees, situated on the reef close south-westward of Tanjong Roeba Roeba (Ruba Ruba), and Adoei, in depths of from 16 to 38 fathoms (29^m3 to 69^m5); the inner part of the bay is
35 not navigable. The passage south-eastward of Adoei is encumbered with rocks and is not recommended. The two Toetoe eilandjes (Pulau Tutu), close off the northern extremity of Kahatola, and Njaolako and Tiro, two rocky islets, lying on the reef fringing the south-western side of Sidanga, are useful marks when approaching from westward.

- 40 Sungei Loloda flows into the northern side of the bay, but it is only navigable by praus. Loloda village is situated a short distance up the river.

Chart 2788.

- Coast.**—Between Tanjong Rongi Mhé, situated $4\frac{1}{2}$ miles southward
45 of Tanjong Roeba Roeba, and Tanjong Bobo, a high and steep point about 37 miles south-south-westward, the coast is high and too steep to be accessible except in the bights, where it is low and which can be identified by the plains which extend inland from them. The points are remarkable on account of the desolate mountainous land, which,
50 contrary to the coast farther southward, is volcanic, with still active volcanoes, forming the highest peaks of Halmahera.

About $2\frac{1}{4}$ miles southward of Tanjong Rongi Mhé (*Lat.* $1^{\circ} 39' N.$, *Long.* $127^{\circ} 32' E.$) is Toloefoe (Tolufu) village, situated at the mouth of a rivulet, which flows out in a bight, in which there is a narrow sandy

Chart 2788.

beach. A rock, which dries, lies about half a mile westward of the mouth of the rivulet, and a one-fathom (1^m8) patch lies about three-quarters of a mile southward of the rock. A spur from Loloda, a conspicuous mountain, 3,587 feet (1093^m3) high, with a rounded summit, situated $7\frac{1}{2}$ miles east-north-eastward of Toloefoe, extends to the coast near the northern bank of the rivulet. There is a small peak on the long southern slope of Loloda. See view facing page 49.

Tanjong Ligoa ma déhè, about 4 miles south-south-westward of Toloefoe village, is a high and conspicuous point, close eastward of which is Pitji, a conspicuous rock. Thence to Tanjong Doeko (Duko), 10 miles southward, the coast is mostly low, except for Ngidi Matjin (Ngidi Ma Chin), a hill, 382 feet (116^m4) high, $5\frac{1}{2}$ miles southward. About 6 miles east-north-eastward of Ngidi Matjin is Iboe (Ibu), 4,535 feet (1382^m3) high, with a crater. From southward and south-westward the eastern crater wall appears as a separate peak; from southward, of Zuid Loloda eilanden the western crater appears as a separate peak; on the southern side of Iboe there is a lower peak.

About $3\frac{1}{2}$ miles southward of Tanjong Ligoa ma déhè, the Sungei Iboe flows out; it is narrow at its mouth but widens inside and is navigable by large praus. A small rivulet flows into the Iboe at its first bend, and there are several villages on its banks. A sandbank extends from the mouth of the river.

Anchorage may be obtained southward of the mouth of Sungei Iboe, in a depth of $6\frac{1}{2}$ fathoms (11^m9), sand, about three-quarters of a mile offshore, with Tanjong Ligoa ma déhè bearing 348° , and Iboe, 092° . Farther southward the depths are less, with a sandy bottom, and farther northward the bottom is rocky. During the West monsoon it is not advisable to anchor closer inshore on account of the swell, which may rise very suddenly; during the East monsoon a vessel can anchor from one to $1\frac{1}{2}$ cables closer in, in a depth of 5 fathoms (9^m1).

There is no landing place at the mouth of Sungei Iboe during the West monsoon, but landing can be effected at the mouth of a small rivulet farther northward, where the beach ceases and where some rocks afford shelter from the north-westerly and westerly swell. Tobalo village is situated on this rivulet, and Tahafo village stands about $1\frac{1}{2}$ miles southward of Sungei Iboe.

Sungei Gam Konora flows out about 2 miles southward of Tahafo; it drains the marshy land and the coastal forest, through which a number of creeks flow. Small vessels with local knowledge can approach the river through a channel in the coastal bank, although it is constantly shifting. Anchorage may be obtained, in a depth of 22 fathoms (40^m2), sand, with Tanjong Doeko bearing 217° , and the volcano Gam Konora, 157° .

Gam Konora, an active volcano, 5,139 feet (1566^m4) high, lies 3 miles eastward of Tanjong Doeko (*Lat.* $1^\circ 23' N.$, *Long.* $127^\circ 29' E.$); close westward of the summit is a conspicuous peak, over which smoke continually hangs. Popolodjo, a truncated cone, 2,075 feet (632^m5) high, and Alon, a blunt cone, 2,803 feet (854^m3), are the highest peaks of a ridge which extends northward to the slopes of Gam Konora, lying about $3\frac{1}{2}$ and $4\frac{1}{2}$ miles, respectively, south-south-westward of its summit. Onoe (Onu), about $3\frac{1}{2}$ miles south-westward of Alon, is 3,640 feet (1109^m5) high, and appears conical from westward. Twee Gebroeders (Two Brothers), with a double peak, 4,273 feet (1302^m5)

Charts 2575, 943, 942a, 1263.

Chart 2788.

high, lies about $3\frac{1}{2}$ miles southward of Onoe, and one mile farther south-south-westward is Sahoe, 4,122 feet (1256^m4) high, and conical in shape; its summit is often obscured by clouds. Lava beds extend from the foot of Sahoe to the coast. *See* view facing this page.

Todahé baai is an inlet with a narrow entrance about 2 miles south-south-westward of Sahoe, and affords a safe shelter to small vessels with local knowledge, off the village of the same name. It is the only good refuge for small craft during the West monsoon between Sungei Iboe and Sidangoli (page 53). The inlet cannot be identified until close to it.

Good anchorage may be obtained, in depths of from 16 to 22 fathoms (29^m3 to 40^m2), off Soesoepe village, situated in Sahoe baai, about $2\frac{1}{2}$ miles south-south-eastward of Todahé baai. Vessels should not proceed into a depth of less than 11 fathoms (20^m1), as with westerly winds, even when they are light, there is surf closer in owing to the rapid decrease in the depths. The narrow plain within Sahoe baai is fertile and thickly populated.

Chart 2786, plan of Approaches to Ternate.

Saló, an islet close offshore, about 2 miles northward of Tanjong Bobo, is conspicuous; a reef, which dries, lies close offshore about a quarter of a mile southward of Saló.

Djailolo (Jailolo), 3,398 feet (1035^m7) high and conical in shape, lies 3 miles north-eastward of Tanjong Bobo; nearly one mile westward of Djailolo is a conspicuous peak, 2,229 feet (679^m4) high.

Baai van Djailolo (Jailolo bay) is entered between Tanjong Kailoepa, about 2 miles south-eastward of Tanjong Bobo, and Tanjong Goeai (Guai), about $3\frac{1}{2}$ miles farther south-eastward. The peninsula, of which Tanjong Goeai is the western extremity, can be identified by three hills, from 650 to 820 feet (198^m1 to 249^m9) high, which rise close within. Baboea is a rocky islet, 57 feet (17^m4) high, about half a mile north-westward of Tanjong Goeai. Djailolo (Jailolo) village is situated within the northern side of the bay, but it is not visible from seaward.

A vessel approaching Baai van Djailolo from southward should keep Kië Matoeboe (Kie Matubu), the summit of Tidore (page 56), astern, bearing about 190° and when nearing Baboea should steer for it, keeping it about midway between two conspicuous trees standing about half a mile within the northern shore of the bay, bearing about 010°, thence pass westward of Baboea, and bring it in line astern with Kië Matoeboe.

Pajo (Payo) village stands on the northern side of the inlet northward of Tanjong Kailoepa, and can be reached by small vessels with local knowledge through a channel in the reef which dries.

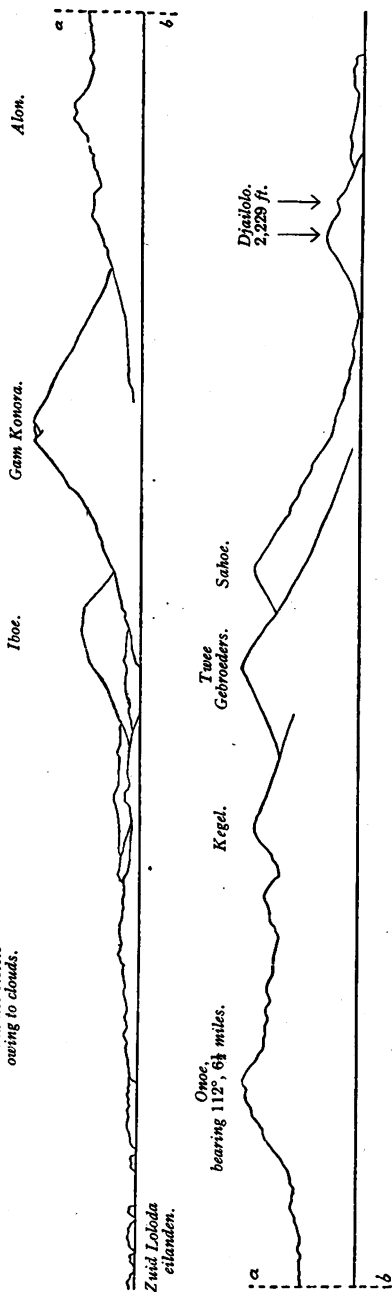
The coast between Tanjong Taoero (Tauro) lamo, about one mile east-south-eastward of Tanjong Goelalo (Gulalo), situated about one mile south-south-eastward of Tanjong Goeai, and Tanjong Sidangoli (Lat. 0° 54' N., Long. 127° 29' E.), about 6 miles southward, is low.

Baai van Tofiri.—Dangers.—This bay, entered between Tanjong Goelalo and Tanjong Ratemoë, about $4\frac{1}{2}$ miles southward, is encumbered with a number of dangers. Tofiri, a sandbank above water, lies about 2 miles offshore, $2\frac{1}{2}$ miles southward of Tanjong Goelalo. A reef, which dries, and a 19-foot (5^m8) patch lie about 7 and 9 cables, respectively, north-north-eastward of Tofiri. Baboea in line with the mountain Djailolo, bearing 338°, leads north-eastward of these dangers.

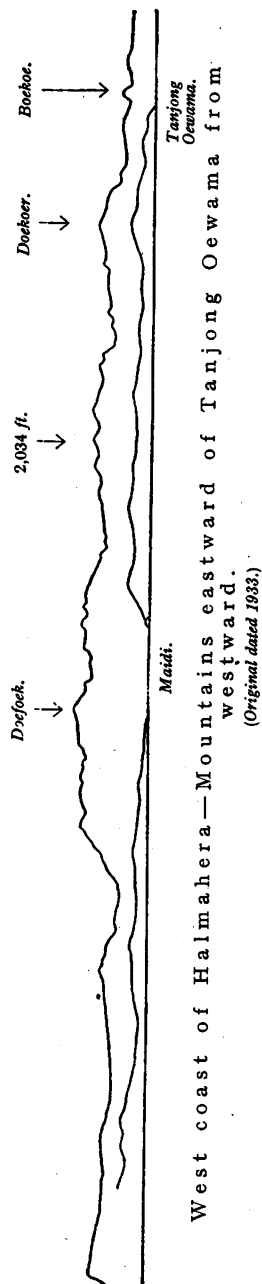
Charts 2788, 2575, 943, 942a, 1263.

To face page 52.

*Loloda not visible
owing to clouds.*



View, in two parts, of western side of Halmahera.
(Original dated 1933.)



West coast of Halmahera—Mountains eastward of Tanjong Oewama from westward.
(Original dated 1933.)

Chart 2786, plan of Approaches to Ternate.

Several shoals, with depths of 6 feet (1^m8) and less, lie within three-quarters of a mile of the coast.

Coast.—Off-lying danger.—Sidangoli village stands on the northern side of an inlet entered about half a mile south-eastward of 5
Tanjong Sidangoli.

Pasir Lamo, with a depth of 13 feet (4^m0), and steep-to, lies 2 miles west-south-westward of Tanjong Sidangoli; it is marked by discoloration.

Dodinga baai.—Dangers.—Beacon.—Dodinga baai is entered 10
between a point about $1\frac{1}{2}$ miles south-south-eastward of Tanjong Sidangoli and Tanjong Oba, about 9 miles farther. Dodinga village is situated on the isthmus which connects the head of the bay with Kaoe baai (page 76), on the eastern side of Halmahera.

A 10-foot (3^m0) patch lies about $1\frac{1}{2}$ miles off the northern shore of the 15
bay just within the entrance, and several reefs, which dry, lie within the same distance of the northern shore about $3\frac{1}{2}$ miles farther eastward.

A shoal, with a least depth of 26 feet (7^m9), lies about $3\frac{1}{2}$ miles north-north-westward of Tanjong Oba. A reef, which dries and is marked by an unofficial beacon surmounted by a cone, lies $2\frac{1}{2}$ miles northward 20
of Tanjong Oba, and another reef, which dries, lies about one mile east-north-eastward of the beacon. Several reefs, with depths of from 6 to 8 feet (1^m8 to 2^m4), lie about three-quarters of a mile off the south-eastern shore of the bay about 3 miles north-eastward of Tanjong Oba.

Anchorage may be obtained in the inlet off Dodinga village. 25

Coast.—The coast between Tanjong Oba and Tanjong Dobegasi, a low point about $10\frac{1}{2}$ miles southward, is steep-to. The land between the coast and the mountains within is low. Except for two peaks 1,386 and 2,082 feet (422^m4 and 634^m6) high, about half a mile eastward and one mile east-south-eastward, respectively, of Tanjong Tapatiti, 30
situated $5\frac{1}{2}$ miles southward of Tanjong Oba, the mountain peaks are not conspicuous. The most conspicuous of the peaks farther inland is one, 2,692 feet (820^m5) high, in the shape of a truncated cone, about $6\frac{1}{2}$ miles eastward of Tanjong Oba.

Off-lying islet and dangers.—Beacon.—Pillongga (Pilongga), 35
a rock, 136 feet (41^m4) high, partly covered with vegetation, lies about 4 miles westward of Tanjong Oba, with a clear channel on either side.

Pasir Radja (Raja) consists of two atolls, which dry, covered with sand and coral dust, the southern of which lies about $3\frac{1}{2}$ miles north-westward of Tanjong Dobegasi (*Lat. $0^\circ 33' N.$, Long. $127^\circ 31' E.$*). 40
A beacon stands on the southern extremity of the northern atoll.
Chart 2788.

Coast.—Anchorages.—Anchorage may be obtained, in a depth of 36 fathoms (65^m8), about 2 cables offshore off Ake lamo village, about $1\frac{1}{2}$ miles southward of Tanjong Dobegasi. 45

About 8 miles southward of Tanjong Dobegasi is Tanjong Silahoro, one mile northward and close southward of which is a small inlet, each with a coastal reef, which dries, marked by discoloration, in which small craft with local knowledge may obtain anchorage, in depths of 20 and 15 fathoms (36^m6 and 27^m4), respectively. 50

About $3\frac{1}{2}$ miles south-eastward of Tanjong Silahoro is Gita village, off which good anchorage may be obtained by vessels with local knowledge, in a depth of 17 fathoms (31^m1), mud, east-north-eastward of the high islet Goerateo, the easternmost of the Woda eilanden, which lie

Chart 2788.

westward of the village; Woda, the northernmost island of the group, is high, but Radja and Tameini, southward of Woda, are low.

Baai van Pajahi.—Dangers.—Baai van Pajahi (Payahi bay) is entered between Tanjong Karokaro, 5 miles south-south-eastward of Tanjong Silahoro, and Tanjong Safi, about 8 miles farther south-eastward. Close eastward of Tanjong Karokaro are the three peaks of Karamboekoe, the westernmost and highest of which has an elevation of 969 feet (295^m3). Close southward of the same point is Djodji (Joji) a high islet, which is a good mark. Tawang, a low islet covered with mangroves; lies on the coastal reef close offshore, nearly one mile eastward of Djodji.

The shores of Baai van Pajahi are bordered by a wide plain, behind which there are a number of peaks, the south-eastern of which is 1,330 feet (405^m3) high. About one mile south-south-eastward of this peak and between which there is a distinct dip, there is a conspicuous steep slope, which is the northern termination of a mountain ridge, which can be identified from a considerable distance. In favourable conditions the peaks show very plainly against the higher mountains of central Halmahera, especially in the early morning from south-westward and when the plain of Pajahi is covered with thick white mist, as is usual about that time.

Takat Main Main, consisting of two reefs, with depths of 19 and 13 feet (5^m8 and 4^m0), lie about 3 miles southward of Tanjong Karokaro. Two reefs, with depths of 3 and 6 feet (0^m9 and 1^m8), lie within 1½ miles southward of Tanjong Saselata, a wooded point about 2½ miles east-south-eastward of Tanjong Karokaro. A reef, which dries, and a reef, with a depth of 3 feet (0^m9), lie about 1½ miles south-eastward and 2½ miles east-south-eastward of Tanjong Saselata. All these reefs are more or less marked by discoloration.

Pajahi village stands on the north-eastern shore, 3½ miles eastward of Tanjong Saselata. Southward of the village the hills have been cleared and planted with coconut trees. There is a waterfall about 3 miles southward of the village.

Off-lying danger.—Beacon.—Nassau rif or Takat Lem Lem, with a least depth of 4 feet (1^m2), and marked by discoloration, lies 9 miles south-westward of Tanjong Safi. Tide-rips sometimes occur in this vicinity.

A beacon, surmounted by a white ball, stands on Nassau rif.

Coast.—Between Tanjong Goemele (Gumele), about 7 miles southward of Tanjong Safi (*Lat.* 0° 16' N., *Long.* 127° 43' E.), and Tanjong Oewama (Uwama), about 3 miles farther southward, the coast is mostly bordered with mangroves, varied only at Maidi village by a small beach with coconut trees, off which there is anchorage for vessels with local knowledge, in a depth of about 15 fathoms (27^m4). There are extensive woods behind Maidi, a village about 1½ miles southward of Tanjong Goemele. Tanjong Oewama rises to an elevation of 428 feet (130^m4), about 1½ miles north-eastward.

Tabrain, 2,203 feet (671^m5) high, about 4 miles southward of Tanjong Safi and one mile inland, is conspicuous. Sinopa, 2,584 feet (787^m6) high, lies about 3 miles east-north-eastward of Tabrain, and can be identified from south-westward. About 6 miles eastward of Tanjong Goemele is the northernmost of a chain of peaks extending about 5½ miles southward, of which Doefoek (Dufuk), 2,577 feet (785^m5) high,

Chart 2788.

is the highest and is very conspicuous. Westward of these peaks there is a wide plain. See view facing page 52.

Between Tanjong Oewama and Tanjong Batoe Lobang, a conspicuous rocky cliff, about $5\frac{1}{2}$ miles southward, the coast is mostly bordered with mangroves and coconut trees. A reef, which dries, nearly half a mile southward of Tanjong Oewama, and a reef close offshore about $1\frac{1}{2}$ miles eastward, are easy to distinguish. Anchorage may be obtained by vessels with local knowledge, in a depth of about 16 fathoms (29^m3), off Lifofa village, about $2\frac{1}{4}$ miles south-eastward of 10 Tanjong Oewama.

About 2 miles southward of Tanjong Batoe Lobang is Batoela (Batula) village, but it is not visible from seaward. Close south-westward of the village there is a flagstaff, a shed with a zinc roof on the beach, and a round-topped tree, southward of the mouth of a river, all 15 of which are conspicuous.

Temporary anchorage may be obtained by vessels with local knowledge, in a depth of about 16 fathoms (29^m3), off Batoela, in a depth of about 21 fathoms (38^m4), off Semo village, about 5 miles southward, and in a depth of about 20 fathoms (36^m6), off Melokoe village, about 20 $4\frac{1}{2}$ miles southward of Semo. Between Semo and Melokoe there are two conspicuous peaks, the northern being 1,556 feet (474^m2) high, with a blunt summit, and the other, 1,868 feet (569^m3) high, and conical. Tanjong Tokaka, about $2\frac{1}{4}$ miles southward of Melokoe, is low, but is rendered conspicuous by the village of the same name standing in a coconut plantation close within, and the mouth of a river close northward. 25

For Straat Patientie, see page 65.

Chart 2786, plan of Approaches to Ternate.

ISLANDS OFF THE SOUTH-WESTERN SIDE OF HALMAHERA.—Hiri.—This island, situated $9\frac{1}{2}$ miles south-south-westward of Tanjong Bobo (page 50), is 2,246 feet (684^m6) high, and appears as a steep cone from a distance. Maka (Lat. $0^\circ 55' N.$, Long. $127^\circ 18' E.$), an islet 202 feet (61^m6) high and some rocks above water, one of which is 60 feet (18^m3) high, and covered with vegetation, lie close westward 35 of the northern extremity of Hiri. See view facing page 57.

The small bight eastward of the northern extremity of Hiri is recommended as an anchorage for vessels with local knowledge.

Ternate.—This island, lying one mile south-south-eastward of Hiri, is composed almost entirely of a conical volcano, 5,645 feet (1720^m7) 40



high. See view facing page 57. This volcano has been in a state of constant activity for more than 300 years, during which period there have been no less than twelve eruptions and violent earthquakes; the

Charts 2788, 943, 942a, 1263.

Chart 2786, plan of Approaches to Ternate.

most violent during the last century occurred in 1840, and was attended by great loss of property. The more recent eruptions in 1862, 1871 and 1907, were much less severe; the northern half of the island has suffered
 5 most.

The coast is fringed by a reef, which extends about a quarter of a mile offshore in places. On the northern side of the island, a bank with depths of less than 6 fathoms (11^m0), marked by discoloration, extends about 3 cables offshore.

10 *Chart 2786, plan of Ternate road.*

Reede Ternate.—Lights.—This roadstead is situated off the town of Ternate, about 2 miles north-eastward of Tanjong Kajoe (Kayu) Merah, the south-eastern extremity of the island, and is the principal anchorage off these islands.

- 15 The limits of the roadstead are the meridian of 127° 23' 23" E. and the parallels of 0° 47' 42" N. and 0° 46' 37" N.

There are two piers at Ternate, the southern of which, named Hertog Hendrik, has a depth of 13 feet (4^m0) at its head, but deepens to 23 feet (7^m0) at a distance of about 30 feet (9^m1) from it. The northern pier is
 20 only available for boats, which are liable to be damaged at low water by rocks which nearly dry. There is a cupola and a flagstaff on this pier.

- There are a number of mooring buoys situated off Hertog Hendrik pier, which are used as hauling-off buoys. Vessels running hawsers ashore are recommended to use a steamboat on account of the
 25 strong current.

A mooring buoy, for the use of aircraft, is moored about 1½ cables south-south-westward of the southern pier.

A light (*Lat.* 0° 47' N., *Long.* 127° 23' E.) is exhibited from the head of each pier.

- 30 Anchorage may be obtained, in a depth of 15 fathoms (27^m4), with the Resident's house in line with the flagstaff in front of it. Vessels should not anchor closer in as the coastal reef is often difficult to distinguish. From December to April there may be an inconvenient swell in the roadstead.

- 35 **Ternate.**—The town extends for about 1½ miles along the coast, and at its southern end there is a conspicuous mosque. It is the headquarters of a Government official.

Provisions are scarce. Water is laid on to Hertog Hendrik pier; about 40 tons can be pumped on board in 24 hours. The Harbour
 40 Office is near this pier.

There is a resident medical officer, and a hospital with a ward for infectious cases.

Ternate is connected to the general telegraph system.

- Climate.**—The climate is healthy, to which the absence of excessive
 45 heat and the fresh sea breeze contribute.

For rainfall, *see* page 25.

Tidal streams.—Strong tidal streams set through Reede Ternate. At high water there is a north-going stream, and at low water a south-going stream.

- 50 *Chart 2786, plan of Approaches to Ternate.*

Tidore.—This island, separated from the south-eastern side of Ternate by Gat van Gamme Lamo, about one mile wide, is of volcanic formation; the southern part of the island consists of a cone, named Kië Matoeboe or Piek van Tidore, 5,763 feet (1756^m7) high, its summit

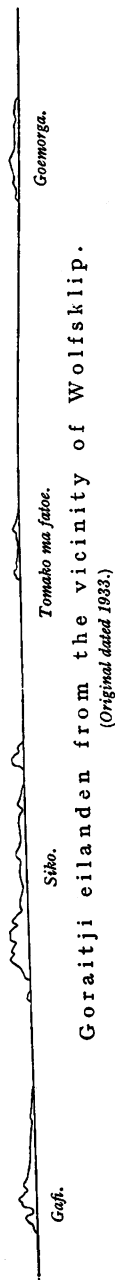
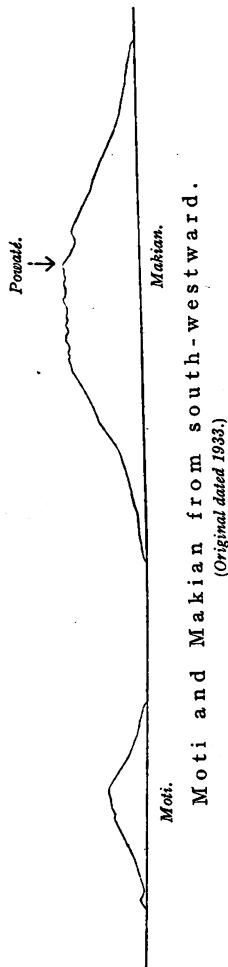
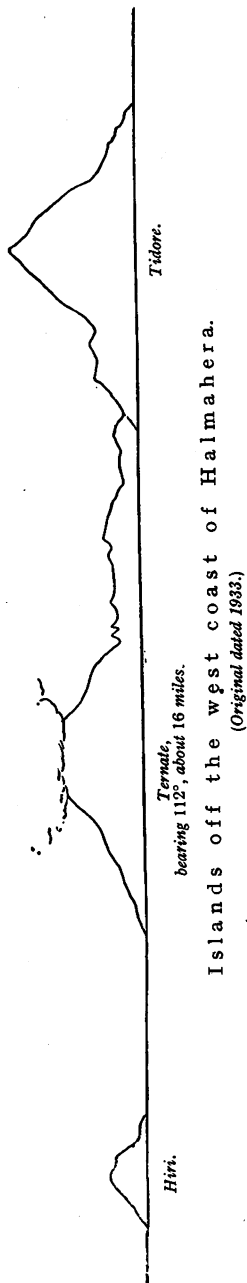


Chart 2786, plan of Approaches to Ternate.

being bare, and the central part thickly wooded up to a height of about 1,000 feet (304^m8); the slopes are cultivated, especially on the eastern side. The northern half of the island is a rugged mass of hills which slope steeply to the sea, with a few level places near the beach. *See* 5
view facing this page.

Gat van Gamme Lamo is deep and clear of dangers in the fairway. A 13-foot (4^m0) patch lies about a quarter of a mile off the southern coast of Ternate. At the south-western end of this channel, with south-westerly winds and a south-west-going stream there is a rough 10
sea.

There are several villages in Tidore, the principal being Soa Sioe or Tidore, on the south-eastern coast, which is conspicuous on account of its white houses and a large mosque; there is a pier here, with a flag-staff at its head. Anchorage may be obtained, in a depth of about 15
10 fathoms (18^m3), off Gam Tokkange village, from about 2 $\frac{1}{4}$ to 5 $\frac{1}{2}$ cables northward of the pier. Elsewhere anchorage may be obtained anywhere northward of the parallel of Kië Matoebœ.

Maitara, an island close westward of the northern end of Tidore, is 1,265 feet (385^m7) high, conical, and covered with coconut trees on its 20
eastern side; it is fringed by a reef, marked by discoloration, which extends about a quarter of a mile from its southern side. The rocky steep western coast is inaccessible.

Pillongga, off the east coast of Tidore, has been described on page 53.

Mare.—This island, 1,114 feet (339^m7) high, lies 2 miles southward 25
of Tidore, being separated from it by Straat Mare, a deep channel clear of dangers in the fairway. Tanjong Kovo, the southern extremity of the island, is 369 feet (112^m5) high, and connected to the hilly land north-eastward by a low ridge. Mare village is situated on the north-eastern side of the island; there is a small pier here. Anchorage may 30
be obtained off the village, in a depth of 27 fathoms (49^m4), and off Kovo village, close eastward of Tanjong Kovo, in a depth of 31 fathoms (56^m7).

Chart 2788.

Moti and Makian.—These active volcanic islands lie about 5 and 35
11 miles, respectively, southward of Mare. Both islands are steep-to, but there is a 6-foot (1^m8) patch lying close off the south-eastern side of Moti, which is only slightly marked by discoloration. Moti is 3,213 feet (979^m4) high, its sides being covered with forest to its summit, between which and a lower peak north-eastward there is a remarkable saddle. 40
Makian is 4,683 feet (1427^m4) high and conical; the last eruption in Moti occurred in 1774 and that in Makian in 1940. *See* view facing this page.

The only anchorage off Moti, available for a vessel with local knowledge, is in a depth of 23 fathoms (42^m1), off Kotta village (*Lat.* 0° 29' N., 45
Long. 127° 25' E.), situated on the north-eastern side of the island. *Chart 2786, plan of Ngofakiaha road.*

The only good anchorage in both monsoons is off Ngofakiaha, on the north-eastern side of Makian, in depths of from 16 to 33 fathoms (29^m3 to 60^m4), sand. There is a small boat pier here. If there is too much 50
swell here, landing can always be effected in the small bight southward of Tanjong Rabadaio, about half a mile northward.

Chart 2788.

Nassau rif, 11 miles south-eastward of Makian, has been described on page 54.

Charts 942a, 1263.

Chart 2788.

- Kajoa.**—Kajoa (Kayoa), an island, lying with Tanjong Boekoe (Buku), its north-western extremity, $8\frac{1}{2}$ miles southward of Makian, has a range of mountains, attaining an elevation of 1,491 feet (454^m5) high, running almost throughout its entire length. The coastal reef is well marked by discoloration. Miskin, an islet, 162 feet (49^m4) high, close off the northern extremity of Kajoa, is conspicuous. Djiré, a rock, 24 feet (7^m3) high, covered with vegetation, lies on the narrow coastal reef close northward of Tanjong Wot Oko, the north-eastern extremity.
- 10 Laloein (Laluin), an island, lies about 2 miles southward of Tanjong Goeroeapin (Guruapin), the south-western extremity of Kajoa, to which it is connected by a reef, which dries in places. A bank, with a depth of $3\frac{1}{2}$ fathoms (6^m9), extends about half a mile southward from Tanjong Waisamola, the southern extremity of Laloein.

15 *Chart 2786, plan of Channel between Kayoa and Laluin islands.*

- Between the northern end of Laloein and the western side of the southern part of Kajoa, are the islets Toabi Kechil, Toabi and Gakkoe-toe (Gakkutu). A channel, available for small craft with local knowledge, marked by unofficial beacons, leads north-eastward between 20 Goeroeapin village, situated about 6 cables south-eastward of Tanjong Goeroeapin, and the north-western sides of Toabi and Toabi Kechil. The southern entrance to this channel leads through Lobang Dapoas between the north-eastern side of Laloein and Gakkoe-toe; the fairway is kept by steering for the mosque in Goeroeapin village, bearing 336° , 25 but the reefs on either side are fairly well marked by discoloration.

Anchorage may be obtained in Reede Goeroeapin, southward of Goeroeapin village, where a swell quickly gets up, or in an inner roadstead eastward of it, in a least depth of $4\frac{1}{2}$ fathoms (8^m7). These roadsteads are separated by a channel with a least depth of 8 feet (2^m4).

30 *Chart 2788.*

Goraitji eilanden.—**Dangers.**—Goraitji (Goraichi) eilanden are a group of wooded islands and islets lying from about 8 to 19 miles westward of Kajoa, extending from Gafi on the north to Taneti on the south. See view facing page 57.

- 35 Siko, the north-westernmost and highest of the group, has an elevation of 808 feet (246^m3); its southern side slopes gradually; its northern and eastern sides consist of rocky cliffs, from about 490 to 650 feet (149^m3 to 198^m1) high. Adoe (Adu), nearly one mile eastward of Gafi, consists of a group of rocks with a sharp summit, and is covered 40 with trees. Tamo Tamo, about $1\frac{1}{2}$ miles south-eastward of Adoe, is a bare steep rock with some shrubs on it. On Laigoma, $4\frac{1}{2}$ miles eastward of Siko, there is a horseshoe-shaped ridge of hills, 389 feet (118^m6) high. There is a rock just above water, which breaks heavily in any sea, situated about midway between Tamo Tamo and the south-western 45 extremity of Laigoma. The shoals in the vicinity of Tamo Tamo are only slightly marked by discoloration.

A bank, with a depth of 52 feet (15^m8), lies about $2\frac{1}{2}$ miles southward of Laigoma (Lat. $0^\circ 08' N.$, Long. $127^\circ 13' E.$).

- Goemorga (Gumorga), an island, 470 feet (143^m3) high, lies $5\frac{1}{2}$ miles 50 southward of Laigoma. A shoal, with a depth of 18 feet (5^m5), only slightly marked by discoloration, lies about 9 cables southward of Goemorga.

Tolimao, an island with several peaks, and covered with coconut trees, lies about 3 miles south-south-westward of Goemorga. The edges of

Chart 2788.

the extensive reef, with rocky islets on it, extending eastward from Tolimao, are well marked by discoloration; the detached shoals in the vicinity are sometimes lightly marked. Lilai, about $2\frac{1}{2}$ miles eastward of Tolimao, is 562 feet (171^m3) high, with coconut trees on its summit. Temo'ma dafa, about one mile southward of Tolimao, is lower than that island, and has a conspicuous round-topped tree on its north-western extremity. 5

Taneti, 766 feet (233^m5) high, lies about 4 miles south-south-eastward of Tolimao. A conspicuous tree stands on a hillock on Tanjong Kida, 10 the western extremity of the island. A shoal, with a depth of 31 feet (9^m4), seldom marked by discoloration, lies nearly one mile north-westward of Tanjong Padi (Paji), the northern extremity of Taneti. Except for this shoal, the channel between Taneti and the group of islands, described above, north-north-westward, is clear of dangers in 15 the fairway.

Anchorage may be obtained by vessels with local knowledge in various places in Goraitji eilanden, but the depths are considerable; the holding ground, of greyish green sandy clay, is good. There is a fairly strong stream, dependent on the wind. The best berth in the group is 20 in Reede van Tagono, eastward of the southern extremity of Goemorga, in a depth of 17 fathoms (31^m1), close to the loading place, which is visible from seaward.

The principal villages in Goraitji eilanden are:—Akedjodjaroe (Akejojaru), near the south-eastern extremity of Siko; Gafi, on the 25 southern side of the island Gafi; Baroe, on the south-eastern side of Laigoma; Tagono and Akedabo, on the south-eastern side of Goemorga; and Boeli (Buli), on the north-western side of Taneti.

Outlying danger.—Wolfsklip (Wolf rock), which dries at exceptionally low water, and is steep-to, lies about 12 miles west-north-westward 30 of Siko. It can usually be identified by the breakers on it.

BATJAN EILANDEN.—This group comprises Lata Lata, Kasiroeta, Mandioli, and Batjan (Bachan).

Tidal streams.—The tidal streams in the Batjan group do not usually exceed a rate of more than 2 knots. 35

Lata Lata eilanden.—**Off-lying danger.**—These islands, lying about 5 miles south-westward of Taneti, comprise Moeari (Muari), 1,114 feet (339^m6) high, Lata Lata, 1,386 feet (422^m5) high, Pao Besar and Pao Kechil, the latter of which appears as a cone. Between the first two there is a passage, about 40 yards (36^m6) wide, with a least 40 depth of 6 fathoms (11^m0); and between Pao Besar and Pao Kechil there is a reef, with a depth of 26 feet (7^m9).

Tolimago (*Lat. $0^{\circ} 10' S.$, Long. $127^{\circ} 11' E.$*), a rocky islet, with trees on it, lies midway between Taneti and Moeari.

Toeapen (Tuapen), about $2\frac{1}{2}$ miles north-westward of Tanjong 45 Idimafala, the northern extremity of Lata Lata, consist of three rocks, 159 feet (48^m5) high. A reef, with a depth of 28 feet (8^m5), lies about one mile southward of the rocks.

The best anchorage for vessels with local knowledge is in the small bay on the eastern side of the northern entrance to the channel between 50 Moeari and Lata Lata, in a depth of 27 fathoms (49^m4). Anchorage may also be obtained by vessels with local knowledge off Gomo village in the bay of the same name on the western side of Moeari; off Boesoea

Chart 2788.

village, on the eastern side of Moeari, 2 miles southward of Tanjong Hoefau (Hufau), its north-eastern extremity; and in Bobo baai, at the northern end of the western side of Lata Lata.

- 5 **Kasiroeta.**—Kasiroeta or Tawali Besar, with its north-western side about 2 miles south-eastward of Moeari has two very conspicuous peaks, of which Boekoe (Buku) Kabau, a dome-shaped summit, 2,701 feet (823^m3) high, situated in the northern half of the island, is the summit, and close south-westward of it, there is a conical peak, 2,508 feet
10 (764^m4) high. There are two fairly conspicuous peaks in the midst of hilly land at the south-western extremity of the island, which is separated by a valley, extending in a north-westerly and south-easterly direction, from a ridge along the north-eastern side of Imboe Imboe (Imbu Imbu) baai, on which Doefa Doefa (Dufa Dufa), 1,638 feet
15 (499^m3) high, and Tjoekoer (Chukur) are fairly conspicuous from south-westward.

The coast is rocky and steep, and there are a number of islets lying close off it. The only detached danger is a 9-foot (2^m7) patch, sometimes well marked by discoloration, lying about 1½ miles eastward of
20 Pao Kechil.

The western coast of Kasiroeta affords several anchorages to vessels with local knowledge, although during the strength of the North-west monsoon there is frequently a high sea with heavy surf in many places.

- 25 Mamang baai, near the northern end of the west coast, affords sheltered anchorage in all winds, in a depth of 22 fathoms (40^m2), eastward of an islet lying on the north-eastern side of Djodjok, an island situated on the northern side of the bay. The bay is easily entered by eye between Djodjok and Palele, an island about three-
30 quarters of a mile south-south-eastward of it. Loleo baai, close southward of Tanjong Loleo, situated about 3½ miles south-south-eastward of Tanjong Sengga, the north-western extremity of Kasiroeta, is partly sheltered by the Lata Lata eilanden. Palamea village stands on the shore of this bay, about 1½ miles southward of Tanjong Loleo.
35 Tanjong Besori, about 5 miles southward of Tanjong Loleo, is a high steep point separating Lompoes baai from Besori baai. In the latter there is a depth of about 21 fathoms (38^m4), and access to it is obtained through a narrow channel clear of dangers between the islets Besori Kechil and Besori Besar. There is a village standing on the shore of
40 this bay.

Two rocky islets, lying close off Tanjong Marikapal, about 4 miles southward of Tanjong Besori, are conspicuous.

Straat Sambaki and northern approach.—Dangers.—Beacon.

- This strait separates the eastern side of Kasiroeta from the north-
45 western end of Batjan (Bachan). Tawali Kechil (*Lat.* 0° 14' S., *Long.* 127° 18' E.), a steep rocky islet, 375 feet (114^m3) high, lies about 1½ miles northward of Tanjong Tawali Besar, the north-eastern extremity of Kasiroeta. A reef extends about 2½ cables south-westward from the southern extremity of Tawali Kechil. Tanjong
50 Tawali Besar is connected to the hilly northern coast of the island by a lower neck of land. Two dome-shaped mountains, 1,615 and 1,350 feet (492^m0 and 411^m5) high, situated on Batjan, about 3 miles south-eastward of Tanjong Batoemangara (Batumangara), the north-western extremity of the island, are very conspicuous.

Chart 2788.

Todoekoe (Toduku), an island 490 feet (149^m3) high, lies in the middle of the northern entrance of the strait, and Salipogot, an islet, lies close off the eastern entrance point, with Poko Poko, a rocky islet close westward of it, leaving a deep channel, about 4 cables wide, between it and 5 Todoekoe. A 3½-fathom (5^m9) patch, seldom marked by discoloration, lies about a quarter of a mile northward of Salipogot.

The Kasiroeta shore rises steeply, and can be approached closely nearly everywhere. Tanjong Todoekoe, 1½ miles southward of the island of the same name, is conspicuous, and there is a bare rocky 10 patch close northward of Tanjong Semo Semo, a moderately high point, about 5 miles farther southward. The Batjan shore is moderately low, and is fringed in places by a reef, but rises steeply within. A hill, 464 feet (141^m4) high, about half a mile eastward of Tanjong Bibi, about 4 miles southward of Tanjong Batoemangara, and Boekoe 15 Indari, 3½ miles farther south-south-westward, are noticeable.

A 19-foot (5^m8) patch lies on the eastern side of the fairway, about 2½ miles southward of Tanjong Batoemangara; it is not marked by discoloration.

Pasir Masarang, with a least depth of one foot (0^m3), lies in the 20 fairway about 8 cables south-eastward of Tanjong Soepai (Supai), situated about 1½ miles southward of Tanjong Todoekoe; it is marked by an unofficial beacon, surmounted by a cone, which was reported, in 1936, to have disappeared.

Two detached reefs, which dry, lie on the eastern side of the fairway 25 about one mile south-westward of Tanjong Bibi.

Chart 2786, plan of Southern approach to Sambaki strait.

Southern approaches to Straat Sambaki.—Dangers.—Beacons.—In the southern approach to Straat Sambaki are the Batoe Ampat eilanden, the principal of which are Waring, 356 feet 30 (108^m5) high, Batoe Ampat, 540 feet (164^m6), and Tambelik, 622 feet (189^m6); there are many other islands of less elevation, the positions of which may best be seen on the chart. Toeada (Tuada), the northernmost of the group, is covered with coconut trees, and the others are all wooded. Close eastward of the south-eastern extremity of 35 Waring, is Tarakian (*Lat.* 0° 33' S., *Long.* 127° 15' E.), a white rocky islet, which is very conspicuous.

Straat Sambaki is entered from southward through three channels: on the west is Straat Nanoang, between the south-eastern side of Kasiroeta and Batoe Ampat; in the middle is Straat Batoe Ampat, 40 between Batoe Ampat and Tambelik; and on the east is Straat Herberg, between Tambelik and the western side of Batjan.

Straat Nanoang is deep and clear of dangers in the fairway, but a reef, with a depth of 5 feet (1^m5), lies within 3 cables of Tanjong Djere (Jere), on the western side of its southern entrance, and a reef, with a least 45 depth of 15 feet (4^m6), lies within the same distance of the western extremity of Batoe Ampat.

Straat Batoe Ampat is marked by beacons, and is the channel recommended. Two detached reefs, with depths of 5 and 9 feet (1^m5 and 2^m7), the former of which is marked by a beacon surmounted by a white 50 ball, lie on the western side of the fairway, about half a mile northward of the south-eastern extremity of Batoe Ampat. A reef, which extends south-westward from the western extremity of Tambelik, is marked by a beacon, surmounted by a black ball.

Charts 942a, 2759a, 1263.

D

Chart 2786, plan of Southern approach to Sambaki strait.

The tidal streams in Straat Batoe Ampat and Straat Herberg sometimes attain a rate of 3 knots.

On the western side of the southern entrance to Straat Herberg, 5 connected to the southern extremity of Tambelik by a reef, is Noesa (Nusa) Saga, a wooded islet, a quarter of a mile eastward of which is a shoal, with a depth of one foot (0^m3). Herberg and Meroe (Meru) are islets in the middle of the strait; there is a round-topped tree on the western side of Meroe.

10 Pasir Nondang, a sand patch, which dries, lies close off the coast of Batjan, about 8 cables north-north-eastward of the northern extremity of Tambelik. When covered, some mangroves on it are conspicuous. A 26-foot (7^m9) patch lies 4 cables northward of the eastern extremity of Toeada.

15 *Charts 2786, plan of Southern approach to Sambaki strait, 2788.*

Caution.—In the narrow passages the mariner should never depend on the discoloration of the reefs; during the strength of the streams the shoals are sometimes marked by strong ripples and whirlpools, on the side opposite to the direction from which it is setting. Off the more 20 open parts of the coast the water is very clear during the transition periods between the monsoons, when the bottom can be plainly seen at depths up to about 9 fathoms (16^m5); nevertheless, when the sea is very calm, most of the detached reefs are not marked by discoloration. During the strength of the monsoons, both outside the group and within 25 the islands, the water is choppy and discoloration cannot be depended on anywhere.

Directions for Straat Sambaki.—A vessel approaching Straat Sambaki from northward should avoid the two detached reefs, with depths of 13 and 19 feet (4^m0 and 5^m8), lying about a quarter of a mile 30 offshore, close southward of Vuile hoek, situated about half a mile southward of Tanjong Tawali Besar. If approaching from north-eastward, after rounding Tanjong Batoemangara, the 3½-fathom (5^m9) patch northward of Salipogot must be avoided. After passing between Todoekoe and Poko Poko, the vessel should bring Poko Poko 34 in line with the eastern extremity of Tawali Kechil (*Lat.* 0° 14' S., *Long.* 127° 18' E.), bearing 004°, and steer with these marks in line astern, which leads eastward of Pasir Masarang, thence keep in mid-channel to the northern entrance of Straat Batoe Ampat or Straat Herberg.

40 If proceeding through Straat Batoe Ampat the vessel should be guided by the beacons.

If proceeding through Straat Herberg she should pass not less than one cable westward of Pasir Nondang, thence westward of Meroe and Herberg, thence with the round-topped tree on the western side of 45 Meroe, bearing 353°, astern, just open westward of Herberg, which leads clear of all dangers to the southern entrance of the strait.

Chart 2788.

Mandioli.—**Dangers.**—This island, about 5 miles southward of Kasiroeta, is high at its northern end, where Boekoe Gakoe attains an 50 elevation of 1,084 feet (330^m4). Tanjong Sarawaki, the north-western extremity, is rendered conspicuous by an islet of the same name, lying on the drying reef which extends 3 cables westward from the point. A 3-foot (0^m9) patch well marked by discoloration, lies one mile north-north-eastward of this point.

Charts 942a, 2759a, 1263.

Chart 2788.

Samo, a white bare sandbank on a reef which dries, and Ambatin, an islet with two conspicuous round-topped trees near its north-western extremity, and chiefly covered with coconut trees, lie about $3\frac{1}{2}$ and $2\frac{1}{4}$ miles, respectively, north-westward of Tanjong Sarawaki. A 26-foot (7^m9) patch lies about 4 cables south-eastward of Ambatin. Pasir Karo, similar to Samo, and a reef which partly dries, about three-quarters of a mile north-north-westward of it, lie about 3 miles west-south-westward and westward, respectively, of Tanjong Sarawaki. A shoal, with a depth of 26 feet (7^m9), well marked by discoloration, lies about half a mile south-south-eastward of Pasir Karo.

Several islets and shoals lie off the west coast of Mandioli, the outermost shoal having a depth of 26 feet (7^m9), situated about $1\frac{1}{2}$ miles westward of Tanjong Lobi Lobi, 4 miles southward of Tanjong Sarawaki. Ligoea, an islet lying close off Tanjong Ligoea, about $2\frac{1}{4}$ miles south-south-westward of Tanjong Lobi Lobi, is low and covered with vegetation. Gamjaha, with a least depth of 49 feet (14^m9), sometimes marked by discoloration, lies $2\frac{1}{4}$ miles south-westward of Tanjong Ligoea.

Kosah baai, entered about $1\frac{1}{4}$ miles south-eastward of Tanjong Sarawaki, and Jojok baai, close southward of Tanjong Lobi Lobi, afford anchorage to vessels with local knowledge during the transition periods of the monsoons. In the strength of the monsoons with north-westerly or south-westerly winds, a high sea quickly rises.

The southern coast of Mandioli is low and fringed with mangroves. The south-eastern peninsula has the appearance of a table-top from southward, terminating in Tanjong Manga, the south-eastern extremity of the island. There are two villages on this coast, about $5\frac{1}{2}$ and $3\frac{1}{4}$ miles, respectively, westward of Tanjong Mangga. The only anchorage for a vessel with local knowledge off this coast, is in a depth of about 12 fathoms (21^m9), close westward of the western village, but it is dangerous during the southerly monsoon.

The eastern coast of Mandioli, except its northern extremity, is low. In the approach to Indawiwi baai, close southward of Tanjong Boekoe Gakoe (*Lat. $0^\circ 37' S.$, Long. $127^\circ 16' E.$*), the north-eastern extremity of the island, is Dajoang, an islet, nearly one mile south-eastward of the point, and a 3-fathom (5^m5) patch between, and about one mile farther southward is Ambatoo, a high rocky islet, covered with coconut trees, with a reef about three-quarters of a mile west-north-westward of it. The east coast is sparsely inhabited.

Good anchorage may be obtained by vessels with local knowledge almost everywhere off the east coast with favourable weather conditions, but in considerable depths in some places.

Current.—A constant northerly current, the wind being light from southward all the time, was experienced by H.M.S. *Flying Fish* in September, 1885, during a search for Bahia reef, reported to exist about 25 miles south-westward of Mandioli. In November, 1891, H.M.S. *Penguin* found the current off the west coast of Halmahera setting S. by E. at the rate of $1\frac{1}{2}$ knots. It is stated that there is always a southerly current off this coast during the North-west monsoon.

Severe tide-rips are experienced, extending to a distance of about 30 miles westward and north-westward of the Obi eilanden.

Straat Batjan.—**Beacons.**—Straat Batjan (Bachan strait),

Charts 2788, 942a, 2759a, 1263.

Chart 2788.

between Mandioli and the south-western side of Batjan, is entered at its southern end between Tanjong Manga and Tanjong Maregarango, about 9 miles east-south-eastward. There are four passages between
 5 the Obit group of islands leading into the strait from northward, but the three western are seldom used.

The Obit group, of which Obit is the principal island, are low islands, mostly covered with coconut plantations. There is a conspicuous tree on Tanjong Batoe Ra, the north-western extremity of Obit, and there
 10 is a conspicuous mosque at Sangkoeangkano, on the north-eastern coast, about one mile south-eastward of Tanjong Paiseombaos, the north-eastern extremity of Obit. Dawora, about $1\frac{1}{2}$ miles eastward of Tanjong Boekoe Gakoe, is wooded. The three islets off the south-western side of Parapotang, the westernmost large island of the group,
 15 are almost entirely covered with mangroves. On the south-western side of Parapotang there is a village in which there is a conspicuous zinc chimney.

Straat Oedjoeng Masaran (Ujung Masaran strait), the eastern passage, is the usual channel taken by vessels proceeding to Laboeha
 20 from northward. It is clear of dangers in the fairway, the only danger being a $3\frac{1}{4}$ -fathom (5^m9) patch close off the north-eastern side of Obit, about $1\frac{1}{2}$ miles south-eastward of Tanjong Paiseombaos. The edge of the fringing reef on the western side of the strait in the vicinity of this point is marked by a number of unofficial beacons. The usual route
 25 through the strait is between Tanjong Paiseombaos and Mamboeat, a hilly island, about 3 cables north-eastward, thence northward of Noesa Ra, a hilly island, about $1\frac{1}{2}$ miles north-north-eastward of Tanjong Obit, the south-eastern extremity of Obit. There is also a deep and clear channel between Tanjong Obit and Noesa Deket, about three-
 30 quarters of a mile north-north-eastward.

Anchorage may be obtained by vessels with local knowledge, in a depth of 22 fathoms (40^m2), out of the influence of the stream, off Balimbing village, situated in Belang Belang baai, on the north-eastern side of Straat Oedjoeng Masaran.

35 The eastern shore of Straat Batjan, between Tanjong Maregarango (Lat. $0^\circ 50' S.$, Long. $127^\circ 28' E.$) and Laboeha, about $11\frac{1}{2}$ miles northward, is low and steep-to, with a few rivulets, villages, and some coconut plantations. Near the southern end the land rises to the massive Sibela gebergte, which attains an elevation of 6,921 feet
 40 (2109^m5), about 6 miles north-eastward of Tanjong Maregarango.

There is a small pier at Penamboean, a settlement situated 8 miles northward of Tanjong Maregarango.

Charts 2786, plan of Labuha road, 2788.

Reede Laboeha.—Lights.—The limits of Reede Laboeha (Labuha
 45 road) are an imaginary line joining Tanjong Obit and Anak Saudara, a peak, 1,235 feet (376^m5) high, $5\frac{1}{4}$ miles eastward, and an imaginary line drawn in a 225° direction through Tanjong Masaran, on the north-eastern side of Straat Oedjoeng Masaran.

The Customs pier is at Laboeha, and the Government pier is at
 50 Amasing village, about $2\frac{3}{4}$ cables north-westward.

A light is occasionally exhibited, at an elevation of 7 feet (2^m1), from the head of the Customs pier.

A light is exhibited, at an elevation of 21 feet (6^m4), from a wooden post, 13 feet (4^m0) in height, from the head of the Government pier.

Charts 2788, 942a, 2759a, 1263.

Charts 2786, plan of Labuha road, 2788.

There is a conspicuous tree standing on the eastern end of Dorapedo, a reef which dries, close off the northern shore, 8 cables westward of the Customs pier, and there is a conspicuous flagstaff about half a cable south-eastward of the Controleur's pier. 5

Kali Mendawong flows into the sea close southward of two conspicuous trees, about one mile southward of the Customs pier.

The best berth for anchoring is in a depth of from 7 to 9 fathoms (12^m8 to 16^m5), soft mud, in the north-eastern part of the roadstead. If there is too much swell, vessels may find shelter in Belang Belang 10 baai.

Laboeha.—Laboeha town is the headquarters of a Government official and of the Sultan of Batjan; it is the centre of trade in damar and copra.

The town is connected to the general telegraph system. 15

Chart 2788.

Batjan.—**Dangers.**—**Beacon.**—Batjan (Bachan) is generally mountainous. Sibela gebergte (page 64), the highest part of the island, is separated from the high south-eastern peninsula by a conspicuous depression south-westward of Lapan baai (page 67). Near the middle 20 of this peninsula is Zoutberg or Bibinoi, 3,148 feet (959^m5) high, which has a regular cone. In the middle of the island is Boekoe (Buku) Amasing, 3,404 feet (1037^m6) high, which is usually enveloped in clouds, and about 7 miles east-north-eastward of it is Raroang, with an elevation of 3,804 feet (1159^m4), the highest part of a horseshoe-shaped ridge, 25 which appears conical, and is very conspicuous from the southern part of Straat Patientie.

Goro Goro (*Lat. 0° 25' S., Long. 127° 32' E.*), about 6½ miles north-north-westward of Raroang, is 2,918 feet (889^m4) high, with a flat summit, and is conspicuous from the northern end of Straat Patientie. 30 About 3½ miles northward of Goro Goro is a peak, 2,101 feet (640^m4) high, and one mile farther northward is another peak, 1,934 feet (589^m5) high, with a wood on its summit; these two peaks can be identified from the southern part of the strait.

Pasir Balé is a steep-to coral reef, which dries, marked by a beacon, 35 about 10 feet (3^m0) high, lying about 6½ miles north-westward of Tanjong Seki, the northern extremity of Batjan.

Baai van Loid, on the northern side of Batjan, affords anchorage for vessels with local knowledge, in a depth of about 15 fathoms (27^m4), off Geti village, 1½ miles southward of Tanjong Seki. A shoal, with a depth 40 of 26 feet (7^m9), only slightly marked by discoloration, lies about 1½ miles west-south-westward of the village. About half a mile off the western side of the bay are the islands Noesa (Nusa) Raloid, 589 feet (179^m5) high, Noesa Deket, and Babi, 516 feet (157^m3) high. There is a village on Noesa Raloid, and one at the head of the bay. 45

For the southern side of Batjan, *see* page 68.

STRAAT PATIENTIE.—**Dangers.**—Straat Patientie or Koesoe Ma Doro, which separates Batjan from the south-western side of Halmahera, is the usual route for vessels plying between Ternate and New Guinea. The northern end of the strait is somewhat obstructed 50 by Koesoe eilanden, but there are deep channels between them.

Koesoe (Kusu) eilanden, consisting of Saleh Besar, 1,081 feet (329^m5) high, Protjo, Saleh Kechil, 720 feet (219^m5) high, and Koesoe, and

Charts 942a, 2759a, 1263.

Chart 2788.

several islets, are densely wooded; the eastern half of Koesoe is covered with reeds, and Pokal is covered with vegetation. The passages between the islands are clear of dangers; those on either side of Pokal are usually used. Two black rocks, 14 feet (4^m3) high, lie in the passage between Tanjong Manga, the northern extremity of Saleh Besar and Tanjong Semola, on Halmahera; about one mile south-eastward of them is Pulau Djaboe, and one mile farther southward are some black rocks lying on the south-western extremity of a reef.

The tidal streams between Koesoe eilanden and Pokal may attain a rate of 4½ knots at springs, and 3 knots at neaps, but only for a short period during the latter.

Both shores of Straat Patientie are generally steep-to; the only danger on the eastern side is a 15-foot (4^m6) patch, not marked by discoloration, lying close offshore about 16 miles south-eastward of Tanjong Semola.

Between Tanjong Tokaka (page 55) and Tanjong Semola, the eastern shore of the strait is low and covered with coconut plantations, but rises to mountainous land within, of which Oewat Tjain (Uwat Chain), 4,142 feet (1262^m5) high, the summit, is conspicuous from all directions; Rogi Rogi, about 1½ miles north-westward of Oewat Tjain, has two peaks, 3,748 feet (1142^m4) high; Pasegal, about 2½ miles south-eastward of Oewat Tjain, is conspicuous from westward and south-westward.

There are three conspicuous peaks in the vicinity of Tanjong Malaboeha (*Lat. 0° 28' S., Long. 127° 54' E.*), about 13 miles south-eastward of Tanjong Semola, the highest of which has an elevation of 851 feet (259^m4). Gogosoma, 3,115 feet (949^m2) high, is the southernmost and most conspicuous peak of a range extending about 7 miles north-north-westward from abreast Tanjong Boeobè (Buobe), about 13 miles south-south-eastward of Tanjong Malaboeha. A reef, well marked by discoloration, extends a short distance from Tanjong Awis, about 10 miles south-eastward of Tanjong Boeobè. There are low hills in this vicinity.

On the western side of the strait at its southern entrance, Tanjong Wajatimoe (Wayatimu), 8½ miles west-south-westward of Tanjong Boeobè, and Tanjong Biloeloe or Oosthoek, 4½ miles southward, are conspicuous; close within Tanjong Biloeloe are two hills, 851 and 933 feet (259^m4 and 284^m4) high.

A shoal, with a least depth of 11 feet (3^m4), lies about 1½ miles south-south-eastward of Tanjong Wajatimoe. A 39-foot (11^m9) patch lies about 1½ miles north-north-eastward of Tanjong Biloeloe, and a 19-foot (5^m8) patch lies about 1½ miles southward of the same point.

Middelzand (Middle Sand), a shoal, with a depth of 7 feet (2^m1), not marked by discoloration, lies about 3½ miles north-eastward of Tanjong Biloeloe.

Anchoragees.—Anchorage may be obtained by small vessels with local knowledge, in depths of about 7 fathoms (12^m8), in Goeroea (Gurua) Boso, a sheltered inlet on the Halmahera coast, entered about 1½ miles north-westward of Tanjong Semola. The only other anchorage on this coast is off Saketa village, situated in a small bight, about 7 miles east-south-eastward of Tanjong Semola, in a depth of about 13 fathoms (23^m8), sand.

Anchorage may be obtained by vessels with local knowledge, in

Charts 942a, 2759a, 1263.

Chart 2788.

a depth of about 8 fathoms (14^m6), in Reede Sabatang, on the north-eastern side of Batjan about $2\frac{1}{2}$ miles north-westward of Ruige hoek, the eastern extremity of the northern part of the island. Sabatang village, in which there is a conspicuous flagstaff, and south-westward of it a large round-topped tree, stands at the head of the bight. There is a small boat pier here. There is a patch, which dries, close off the village, and a $3\frac{1}{2}$ -fathom (5^m9) patch about 2 cables eastward of it; between them is the recommended anchoring berth.

Babang baai, lying on the northern side of Tanjong Sere ma doppio, about $10\frac{1}{2}$ miles south-south-westward of Ruige hoek, affords anchorage for vessels with local knowledge, in a depth of about 28 fathoms (51^m2), mud, off Babang village. The only danger in the bay is a rock, which dries about 3 feet (0^m9), and is marked by a beacon, lying about half a mile eastward of the village. Kali Sajoeang flows into the bay about one mile northward of Babang. Sindapa, 1,757 feet (535^m5) high, situated $3\frac{1}{2}$ miles north-westward of Babang village, is conspicuous from the bay.

Anchorage may be obtained by small vessels with local knowledge in Lapan baai, entered about $2\frac{1}{2}$ miles southward of Tanjong Sere ma doppio, in a depth of about 32 fathoms (58^m5), westward of the mouth of a river. Gamoedja (Gamuja), an islet lying about half a mile off the western shore of the bay near its entrance, is conspicuous; the channel between is deep and clear of dangers. There is a conspicuous yellow patch on the slope of the land in this vicinity, and some hot springs which emit steam and sulphur vapour, which are visible from seaward. There is a small bight close northward in which anchorage may be obtained, in a depth of about 20 fathoms (36^m6).

Anchorage may be obtained by vessels with local knowledge, in a depth of about 24 fathoms (43^m9), mud and sand, in Telok Kapal ma loleo, entered close south-westward of the point of the same name, situated about one mile south-westward of Tanjong Biloeloc (*Lat.* $0^\circ 47' S.$, *Long.* $127^\circ 54' E.$).

Temporary anchorage may be obtained by vessels with local knowledge, in depths of from 13 to 16 fathoms (23^m8 to 29^m3), close off Gam ma goegoe village, about $2\frac{1}{2}$ miles east-south-eastward of Tanjong Awis.

A small vessel with local knowledge may obtain a safe anchorage in Baai van Gané, on the south-western side of Halmahera, about 15 miles east-south-eastward of Tanjong Boeobè. The coast of Halmahera on either side of this bay can be safely approached to a distance of one mile. A narrow coastal reef, marked by discoloration, extends from both entrance points. Gané di dalam village is situated just within the western entrance point, and can easily be identified from southward by its large mosque.

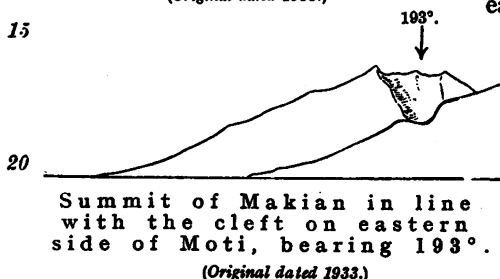
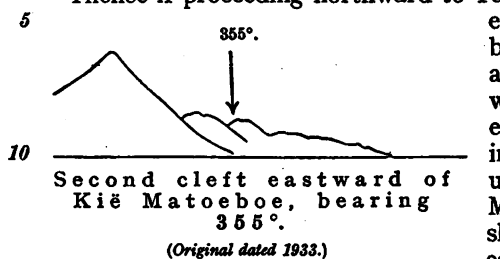
Anchorage may be obtained, sheltered during the South-east monsoon, in Telok Boleh Madjiko, entered about 3 miles southward of Baai van Gané. There are low hills in the vicinity of this bay, rising to Tawaigili, a conspicuous hill, 894 feet (272^m5) high, about one mile southward of the head of the bay.

Directions.—A vessel from southward, after passing from $1\frac{1}{2}$ to 2 miles westward of Dowora Lamo (page 69), should steer for Tanjong Boeobè, and pass eastward of Middelzand. When abeam of this point, which can be passed at a distance of from one to 2 miles, Saleh Kechil

Chart 2788.

and Protjo, at the northern entrance of the strait, may be identified, and she can then steer to pass on either side of Pokal.

- Thence if proceeding northward to Ternate she should steer for the eastern extremity of Makian, bearing about 340° , until Moti and Mare are plainly visible, when she should keep the eastern extremity of Mare bearing 344° , open eastward of Moti until the northern extremity of Makian is abeam, when she should steer for the second cleft eastward of Kië Matoeboe, bearing 355° until the summit of Makian is in line with the cleft on the eastern slope of Moti, bearing 193° , astern, which leads westward of Pasir Radja.
- She can then steer to pass on either side of Pillonga, and if passing eastward of it, the eastern extremity of Ternate in line with the small saddle on the northern slope of Hiri, bearing 317° , is a good mark.



East extremity of Ternate in line with the saddle on the northern slope of Hiri, bearing 317° .

(Original dated 1933.)

STRAAT OBI.—This strait separates the Obi group (pages 98-103) on the south, from the southern side of Batjan and the islands lying off the southern extremity of Halmahera, on the north.

- 30 The Sibela gebergte, extending north-eastward from Tanjong Maregarango (*Lat. $0^\circ 50'$ S., Long. $127^\circ 28'$ E.*), the south-western extremity of Batjan, and Zoutberg, near the middle of the south-eastern peninsula of that island, have been described on pages 64 and 65, respectively. Southward of Zoutberg, near the coast there are five
- 35 peaks, from 1,524 to 2,196 feet (464^m to 669^m) high, the highest part of a fairly conspicuous ridge.

Tanjong Maregarango is low, but is rendered conspicuous by a rocky islet, which is steep-to, lying close southward of it.

- Anchorage may be obtained by vessels with local knowledge off
- 40 Wajaoea (Wayaua) village, at the head of Wajaoea baai, about 11 miles north-eastward of Tanjong Maregarango. A detached reef, which dries, and well marked by discoloration, lies close off the south-eastern shore about 2 miles south-south-eastward of the village.

Anchorage may be obtained by vessels with local knowledge in

Charts 942a, 2759a, 1263.

Chart 2788.

Silang baai, entered close northward of Tanjong Silang, about 15 miles east-south-eastward of Tanjong Maregarango. Two 6-fathom (11^m0) patches lie within 1½ miles southward of Tanjong Silang, and a shoal with a depth of 8 feet (2^m4), lies about 3 cables offshore and about 1½ miles eastward of the same point. These shoals are scarcely marked by discoloration, although the bottom consists of white sand.

Islands and dangers.—Dowora eilanden lie on the eastern side of the southern entrance of Straat Patientie. Dowora Lamo, 1,048 feet (319^m4) high, the south-western island of the group, lies about 11 miles east-south-eastward of Tanjong Biloeloe (page 66). Dowora Itji, 431 feet (131^m4) high, lies close eastward of Dowora Lamo; each of these islands has a rounded top, and when seen from south-westward Dowora Lamo appears as a saddle. The islets lying north-eastward of them are all low. Mano and Waringin, about 2½ and 3½ miles, respectively, north-north-eastward of Dowora Itji, each have a conspicuous tree on them. The reef, on which these islets lie, dries and is well marked by discoloration; the passage between this reef and the Halmahera coast is deep and clear of dangers. Sori, about 2 miles south-eastward of Dowora Itji, is a low rock covered with vegetation, and surrounded by rocks.

Loleodjaha or Vijf eilanden (Loleojaha or Five islands) consist of a number of islets lying on the edges of two extensive reefs, which dry, and are steep-to, about 9 miles southward of Dowora Lamo; when covered these reefs are well marked by discoloration. The islets are covered with bushes and on the northernmost islet there are some coconut trees.

Woka or Groot Geelmuiden, 352 feet (107^m3) high, lies about 3 miles eastward of the easternmost islet on the southern reef of the Loleodjaha group; it consists of two islets close together on a reef. From most directions it has the appearance of a hat with a flat brim. On the summit of the hill on the eastern islet there are two conspicuous trees with white trunks, and on the slopes there are coconut trees and bananas.

Djoronga or Hasselt, about 6 miles east-south-eastward of Woka, has two hills 769 and 726 feet (234^m4 and 221^m3) high, in its western part, and is thickly covered with vegetation. The higher and southern of the two hills, seen from southward is flat on top, on which there is a conspicuous tree in its centre. There is also a conspicuous plume-shaped tree near Waringin village, about 1½ miles from Tanjong Domoro ma doto (*Lat. 1° 08' S., Long. 128° 27' E.*), the south-eastern extremity of the island. See view facing page 70.

An extensive reef, which dries, and is marked by discoloration, and on which there are a number of islets, extends about 3 miles westward from the western side of Djoronga. Several islands, some of which are connected by reefs which dry, lie within 3 miles of the southern side of Djoronga. There is a small hilly ridge on Goemoetoe (Gumutu), which lies on the reef, which dries, about three-quarters of a mile from the western side of Djoronga; and there is a conspicuous round hillock on Orang Kaja, about 1½ miles south-eastward of Goemoetoe. Koebi (Kubi), an islet with a double peak, 510 feet (155^m4) high, lies close north-eastward of Orang Kaja. The other islets in this vicinity are flat, and wooded or covered with mangroves.

A vessel with local knowledge of 180 feet (54^m9) in length, with

Chart 2788.

a draught of about 10 feet (3^m0), can enter the inlet in the reef between Telor and Tadokoe, islets situated southward of Tanjong Domoro ma doto, and obtain anchorage, in a depth of 7 fathoms (12^m8).

- 5 Ganoné or Klein Geelmuiden, an islet with a hillock, on which there is a tree with a round top, lies about 1½ miles westward of the western extremity of Djoronga. Two shoals, slightly marked by discoloration, with depths of 23 and 29 feet (7^m0 and 8^m8), lie 1½ miles south-westward and north-eastward, respectively, of Ganoné. There is sometimes
10 a strong stream in the vicinity of Ganoné and Woka.

Batu Anjer or Zwarte klippen (Batu Anyer or Black rock), 24 feet (7^m3) high, lies 4 miles south-eastward of Tanjong Domoro ma doto. It is an old crater and is steep-to.

- Damar or Salomakie, an island about 2 miles northward of Djoronga,
15 is covered with trees. Koekoepang village stands on piles at the north-western extremity of the island; otherwise there is no trace of cultivation or buildings, except on the islets Katinai Besar and Katinai Kechil, lying within 1½ miles of the north-eastern coast. (*See view facing this page*). Tapa is an island with low hills, lying close off the
20 south-western side of Damar, with a very narrow channel with a least depth of about 8 fathoms (14^m6), and clear of dangers, between. The channel between Tapa and Djoronga is deep and clear of dangers.

MOROTAI.—This island, lying with Tanjong Wajaboela (Wayabula), its western extremity, about 9 miles north-eastward of the
25 northern end of Halmahera, is mostly high, the Sabatai gebergte attaining an elevation of 4,099 feet (1249^m4); there is another summit in the same range with a double peak, 3,318 feet (1011^m3) high, about 6½ miles farther north-eastward. *See view facing this page.*

- North-western side of Morotai.**—**Coast.**—Tanjong Sopi (*Lat.*
30 2° 39' N., *Long.* 128° 34' E.), the northern extremity of Morotai, is low but rises gradually within; it is fringed by a wide reef, on the edge of which are some boulders. Telok Sopi, entered between Tanjong Sopi and Tanjong Padangi, about 7 miles south-westward, affords good anchorage to vessels with local knowledge with favourable winds.
35 Sopi village stands at the head of the bay, and behind it there is a lagoon.

A shoal, with a depth of 19 feet (5^m8), lies about 1½ miles north-eastward of Tanjong Padangi.

- Tidal streams.**—The tidal streams are strong eastward of the
40 northern end of Morotai. Off Tanjong Gorango, about 11 miles south-south-eastward of Tanjong Sopi, the tidal stream has been observed to set northward with the rising tide, at a rate of 3 knots at neaps.

- Coast.**—Between Tanjong Sopi and Tanjong Wajaboela there are a number of peaks, which much resemble each other and differ little in
45 height, with low plains between. Vessels can navigate fairly close to the coast everywhere. Anchorage may be obtained by vessels with local knowledge off this coast, but only in considerable depths and close offshore. There are anchorages off Berri Berri Kechil village, about 2 miles south-westward of Tanjong Padangi, in a depth of about
50 8 fathoms (14^m6); off Hapo village, about 3 miles farther south-westward, in a depth of about 15 fathoms (27^m4); a vessel with a length between 160 and 200 feet (48^m8 and 61^m0), can, in very calm weather, anchor on the line joining the entrance points of this small inlet, but it

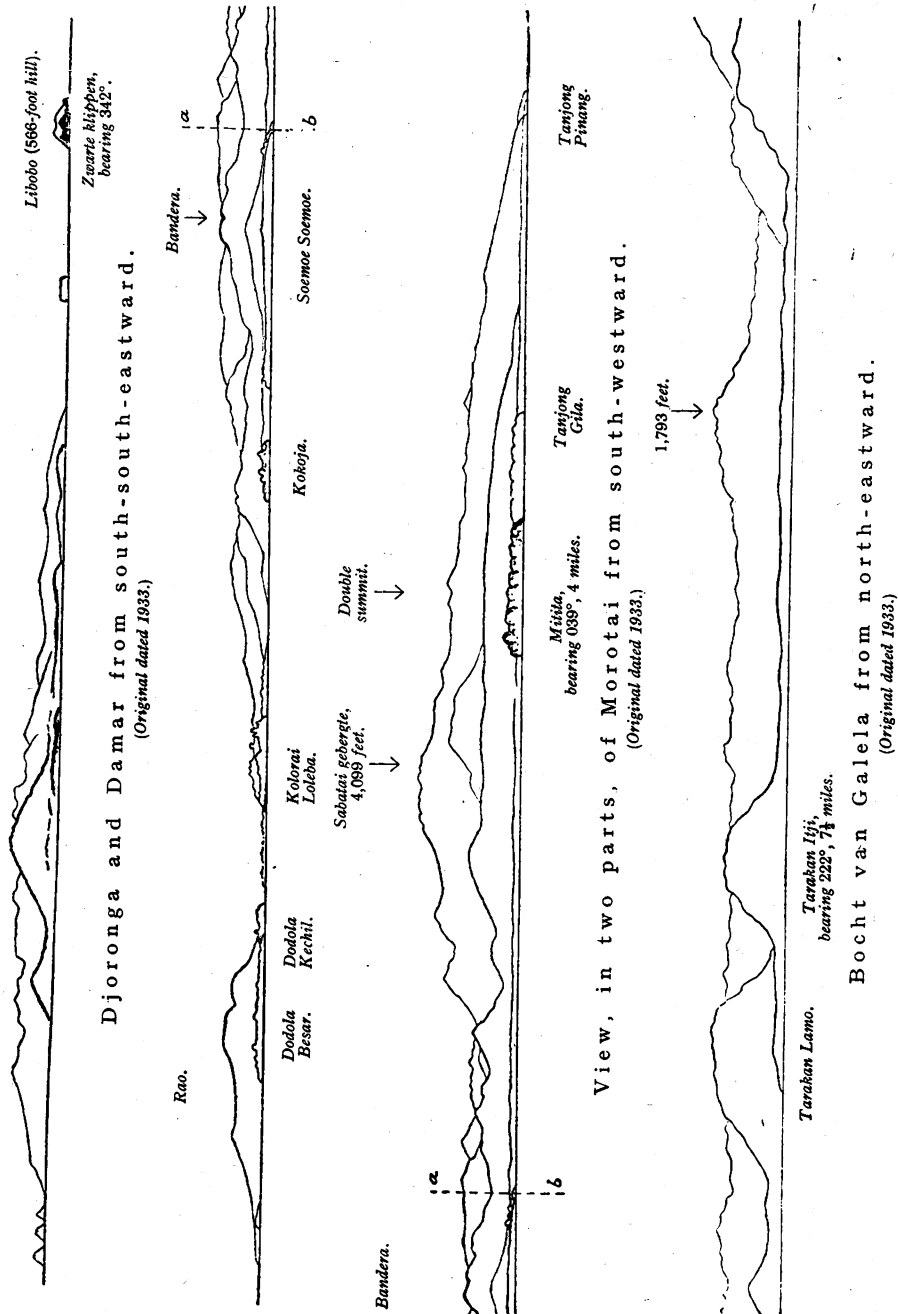


Chart 2788.

is usually better to anchor outside this line. Off Libano village, about $4\frac{1}{2}$ miles south-westward of Hapo, in a depth of about 15 fathoms (27^m4); and off Tjio (Chio), about $5\frac{1}{2}$ miles south-south-westward of Libano, in a depth of about 12 fathoms (21^m9). 5

Rao.—This island is separated at its south-eastern end from Tanjong Wajaboela by Straat Rao, which has a least width of about $1\frac{1}{2}$ miles. On the eastern side of the island there is a mountain, 1,556 feet (474^m2) high, the summit of which appears as a cone from south-westward. A lower inconspicuous peak is situated on the southern slope, which 10 terminates in a hill, 920 feet (280^m4) high, on the south-western side of the island. This ridge descends gradually westward to a fairly wide plain, which is covered with forest, broken occasionally on the coast by coconut plantations. There are three caves in the steep cliff in the vicinity of Aroe (Aru) village, on the east coast, about $2\frac{1}{2}$ miles south- 15 ward of the northern extremity of the island, which are visible from seaward.

Toeanane (Tuanane), a rocky islet, thickly covered with vegetation, lies on the outer edge of the coastal reef close off the northern extremity of Rao; and Tjapali (Chapali) is a similar islet lying on the 20 coastal reef close off the east coast, about 3 miles southward.

Chart 2787, plan of Rao strait and Wayabula road.

Saminjamau is a low islet, thickly covered with vegetation, lying close off the southern extremity of Rao; the western side of the islet is 25 rocky. 25

Straat Rao.—Anchorage.—Straat Rao has a least depth of 23 feet (7^m0) in the fairway. A bank, with a least depth of 26 feet (7^m9), extends about 8 cables from the western side of the strait. The channels on either side of the 23-foot (7^m0) shoal in the middle are indicated by strong tide-rips. 30

Reede Wajaboela (Wayabula) is situated off Wajaboela village (Lat. $2^{\circ} 17' N.$, Long. $128^{\circ} 12' E.$), about half a mile eastward of Tanjong Wajaboela, a low point, on which there is a conspicuous tree. There is a pier at the village. A vessel approaching from westward, and having passed southward of Saminjamau, should bring the 35 southern extremity of that island astern, bearing 282° , and anchor, in a depth of 11 fathoms (20^m1), when the conspicuous tree on Tanjong Wajaboela bears 038° . A more sheltered anchorage is northward of the two reefs which dry, lying about one mile southward of the village. Vessels from westward should pass between the western of these reefs 40 and the 3-foot (0^m9) patch about 6 cables southward of it, and thence between the two reefs.

The western side of Morotai is described with Straat Morotai on page 73.

Chart 2788.

Eastern and southern sides of Morotai.—Coast.—Between 45 Tanjong Sopi and Tanjong Selepia, about 15 miles south-south-eastward, the coast is clear of dangers, but at the latter point the coastal reef extends $4\frac{1}{2}$ cables offshore, which is always distinguished by the heavy surf on it. 50

Chart 2787, plan of Berri Berri anchorage.

The only anchorage between Tanjong Selepia and Tanjong Boboro, about 7 miles south-south-westward, is off Berri Berri village, $2\frac{1}{2}$ miles from Tanjong Selepia. This village stands at the head of a bight

Chart 2787, plan of Berri Berri anchorage.

which is sheltered by a reef which dries, on which is Tabailengi or Visschers eiland, covered with casuarina trees, lying about one mile offshore, east-south-eastward of the village. The approach northward of the reef is unsafe owing to a shoal with a least depth of 7 feet (2^m1), lying 6½ cables northward of the island, and other shoals, which are only slightly marked by discoloration. Vessels may anchor between Berri Berri and Tabailengi, in a depth of about 22 fathoms (40^m2), sand and coral.

- 10 Small vessels with local knowledge, with a length not exceeding 100 feet (30^m5), may anchor in the light in the coastal reef off the entrance to Godji kreek (Kali Goji), about half a mile southward of Berri Berri. This is the best landing place.

The channel between the reef, which dries, the northern extremity of which lies about 7 cables south-eastward of Tanjong Selepia, and the coast of Morotai, is only suitable for small vessels with local knowledge. The sandbank on the western edge of this reef is seldom covered and is subject to change.

Chart 2788.

- 20 Along the east coast between Tanjong Boboro and Tanjong Posi Posi, about 13 miles south-south-westward, there is a ridge with fairly conspicuous peaks, varying in elevation from about 820 to 1,600 feet (249^m9 to 487^m7), behind which, near the middle of the island, is the Sabatai gebergte. See view facing page 70.

- 25 Between Tanjong Boboro (*Lat. 2° 18' N., Long. 128° 39' E.*) and Boesoe Boesoe (Busu Busu) village, about 7 miles south-south-westward, there is a barrier reef, lying from about half to three-quarters of a mile offshore; between it and the coast there is a deep channel with smooth water, which, however, is only suitable for small vessels with local knowledge. There is a large opening in the reef off Tanjong Lefau, about 1½ miles north-north-eastward of Boesoe Boesoe; this point is rendered conspicuous by a small rock on the edge of the coastal reef, and by a white sandy beach, which extends from close northward of it to Bidoho village, about 2 miles south-south-westward of Tanjong Boboro.

From October to March, inclusive, a heavy swell sets into the bay, at the head of which Boesoe Boesoe village is situated, and vessels do not lie safely there during this period.

- Close westward of Tanjong Posi Posi is Sangowo village, off which there is a small opening in the coastal reef, with depths of from 3½ to 5½ fathoms (5^m9 to 10^m1), in which small craft with local knowledge can enter. The western entrance point of the opening is marked by an unofficial beacon, surmounted by a ball, and there is another beacon, surmounted by a rectangle, close eastward of the village. There is usually a swell outside, but small craft can always land safely in the opening.

Vessels with local knowledge may obtain anchorage outside the reef, in a depth of not less than 22 fathoms (40^m2).

- The coast between Tanjong Posi Posi and Tanjong Gila, the south-western extremity of Morotai, can be safely approached to within a distance of one mile, the only danger being a reef, with a depth of 3 feet (0^m9), lying about a quarter of a mile offshore about 4½ miles south-westward of Tanjong Posi Posi. Temporary anchorage may be obtained by vessels with local knowledge in a depth of about 26 fathoms

Chart 2788.

(47^m5), sand, off Sabatai village, situated at the mouth of a river about 9 miles west-south-westward of Tanjong Posi Posi.

STRAAT MOROTAI.—Islets and dangers.—This passage, between the northern end of Halmahera and the western side of Morotai, is clear of dangers in the fairway, but there are some detached shoals in the southern approach (*see* page 74). 5

At the northern extremity of Halmahera is Baai van Soepoe, entered between Tanjong Bisoa (page 49) and Tanjong Loega, about 4½ miles east-south-eastward, in which anchorage may be obtained by vessels with local knowledge, in a depth of about 15 fathoms (27^m4), off Soepoe (Supu) village, at the head of the bay. On the western side near the head of the bay the coastal reef extends over one cable offshore, and there are some detached rocks lying within the edge of this reef. 10

The land slopes gradually towards Tanjong Bisoa and Tanjong Djodjefa (Jojefa), 7 miles eastward. Both points are fringed by a narrow reef, which dries, but they can be rounded safely at a short distance. Between Tanjong Djodjefa and Tanjong Salimoeli, a low point, about 14 miles south-south-westward, the coast is steep-to, but there is a 6-foot (1^m8) patch about a quarter of a mile offshore off Lapi village about 2½ miles northward of Tanjong Salimoeli, and a 13-foot (4^m0) patch about one mile north-eastward of this point. The mountain range in the middle of this peninsula is described on page 48. 20

Anchorage may be obtained by vessels with local knowledge in favourable weather off Saloeta (Saluta), 4½ miles northward of Tanjong Salimoeli, Lapi, and Toefoe (Tufu) ma lolé villages, the latter situated about half a mile southward of Lapi; the depths, however, are considerable, and the bottom is steep. 25

The mountains on the western side of Morotai, which attain an elevation of about 3,300 feet (1005^m8), afford no landmarks for vessels proceeding through Straat Morotai; the peaks of the Sabatai gebergte are difficult to identify, and the only hill near the coast is Bandera, 657 feet (200^m2) high, about 7½ miles northward of Tanjong Gila (Lat. 1° 59' N., Long. 128° 15' E.). The low islands, covered with coconut trees, which lie off this coast, are, however, good marks, and some of them are connected to each other by drying reefs, which are well marked by discoloration. 30

Chart 2787, plan of Tanjong Wayabula to Tanjong Gila.

Ngélé Ngélé Besar and Ngélé Ngélé Kechil, on which there are large villages, are the northernmost islets southward of Tanjong Wajaboela; they lie on the eastern edge of the same reef, which dries, about 1½ miles from the coast of Morotai. Katjoewawa, which is also inhabited, lies close off Tilei village, situated on the Morotai coast about 5 miles south-south-eastward of Tanjong Wajaboela. Tilei village can be reached in a least depth of 19 feet (5^m8). 45

Loleba Besar and Loleba Kechil lie on the eastern edge of a reef, which dries, nearly 2 miles southward of Ngélé Ngélé Kechil, and Galo Galo Besar, which is inhabited, and Galo Galo Kechil lie on the south-western edge of the same reef. Eastward of this group, on the Morotai coast, is Dowongi Kokotoe village. 50

Dodola Besar, Dodola Kechil, Kolorai and Kokoja, which is inhabited, lie on one reef, which dries, the northern end of which lies about 1½ miles southward of Galo Galo Besar. Kokoja, which lies near

Chart 2787, plan of Tanjong Wayabula to Tanjong Gila.

the southern extremity of the reef, can be identified by a white sandy beach on which there are a few huts, on its eastern side. A shoal, with a depth of 16 feet (4^m9), lies about half a mile west-north-westward of the northern extremity of Dodola Besar.

There are a number of islets lying between the reef, which dries, mentioned in the preceding paragraph and the Morotai coast.

Tanjong Gila is the termination of a low tongue of land, covered with low vegetation. A spit, with depths of from 26 to 36 feet (7^m9 to 11^m0), extends about one mile from the point. Mitita is a coral islet, thickly covered with vegetation, lying about 1½ miles south-westward of Tanjong Gila.

The eastern extremities of Kokoja and Kolorai in line, bearing 342°, leads through the channel between Mitita and Tanjong Gila, in the deep channel between the spit mentioned above and the bank fringing Mitita.

Goja oekoe (Goya uku), a reef which dries, lies about one mile south-south-westward of Kokoja. Loetoe Loetoe (Lutu Lutu), a shoal with a depth of 26 feet (7^m9), lies 2½ miles south-south-westward of Kokoja. Pona Ponata, with a depth of 26 feet (7^m9), lies about 2 miles westward of Mitita, and between them is Dododa hohé, a patch which dries.

Chart 2788.

Kokomoroeokoe, with a depth of 10 fathoms (18^m3), lies about 2½ miles south-westward of Mitita. Momow riffen are two patches, with depths of 23 and 26 feet (7^m0 and 7^m9), lying about 10 and 12 miles, respectively, south-westward of Mitita; they are seldom marked by discoloration, but there are tide-rips in their vicinity occasionally.

Charts 2787, plan of Galela road, 2788.

30 EASTERN SIDE OF HALMAHERA.—Bocht van Galela.—Bocht van Galela is entered between Tanjong Salimoeli (*Lat. 1° 59' N., Long. 127° 57' E.*) and Tanjong Loeari (Luari), about 11 miles southward. Between Tanjong Salimoeli and Limaœ village, 7½ miles south-westward, the spurs from Silo and the mountains north-eastward (page 48) approach the coast; thence southward to the high mountain range southward of the bay the coast is bordered by a wide, low plain. Tarakan Itji (Ichi) and Tarakan Lamo, truncated cones, 917 and 1,245 feet (279^m5 and 379^m5) high, respectively, lying within the south-western corner of the bay, are conspicuous. (*See view facing page 70*).

About 2½ miles southward of Tarakan Lamo, and separated from it by a valley is a hilly ridge, which rises to a conical summit, 867 feet (264^m3) high, southward of which there is a depression, and thence the land rises to Valsche Doekono (page 75). Mamoeja (Mamuya), a conical mountain, 3,049 feet (929^m3) high, with a depression in its summit, about 2 miles southward of Tanjong Loeari, is conspicuous.

There are two 6-foot (1^m8) patches lying close offshore, one about half a mile north-eastward of Posi Posi (Posi Posi) village, situated 5 miles south-westward of Tanjong Salimoeli, and the other about one mile north-eastward of Limaœ village. Between Gilitopa village, about one mile southward of Limaœ, and Galela village, 5 miles southward, there is an inaccessible marshy plain. Temporary anchorage may be obtained anywhere, in depths of from 22 to 33 fathoms (40^m2 to 60^m4).

Charts 2788, 2575, 943, 1263.

Chart 2787, plan of Galela road.

Reede Galela.—This roadstead is situated off Galela village, in the south-western part of Bocht van Galela, westward of Tanjong Bongo. There is a boat pier southward of the village. Some buildings with zinc roofs in the northern part of the village can be seen from a considerable distance. 5

Tiabo rivier flows out about 3 miles northward of Tanjong Bongo, and is accessible for boats with local knowledge; there is a bank off its mouth, through which there is a channel with a depth of 5 feet (1^m5), and which leads along the southern bank of the river. 10

Anchorage may be obtained off Galela, in depths of from 16 to 27 fathoms (29^m3 to 49^m4), fine sand, between the boat pier and the islet close offshore westward of Tanjong Bongo. It is sheltered during the southerly monsoon, but is unsafe with a high swell in the North-west monsoon. Landing can be effected, even with the heaviest surf, southward of the islet. Sometimes at night, a malodorous vapour rises from the low land, when the wind from the land is weak or absent. 15

Galela village is the headquarters of a district chief.

Chart 2788.

Coast.—Between Tanjong Loeari and Tanjong Gorango, about 17½ miles south-south-eastward, the coast is low, but rises inland to a mountain range, of which the most conspicuous peaks are Valsche Doekono (Dukono), about 2,950 feet (899^m1) high, about 5½ miles south-westward of Tanjong Loeari, Doekono (Dukono), an active volcano, 4,181 feet (1274^m4) high, and Togohi, 4,194 feet (1278^m4) high. Farther southward the land descends to an extensive plain, in which are Tokito, Tami and Ah, mountains from about 1,700 to 1,900 feet (518^m2 to 579^m1) high. 25

Tobelo eilanden.—**Dangers.**—This low group of coral islands lie within 3½ miles of the coast between Tanjong Loeari (*Lat. 1° 49' N., Long. 127° 55' E.*) and Tanjong Gorango. They are rocky on their eastern and north-eastern sides, and are covered with high trees. The drying reefs, which extend from them in places, are well marked by discoloration. The larger islands, including Tonoeoe (Tonuu), at the northern end of the group, Kakara lamo, Tagaja, Kolorai and Miti, which lies at the southern end, are inhabited. 35

There is a clear channel within Tonoeoe, Kakara lamo and Tagaja, but there is foul ground near the Halmahera coast; there are also channels clear of dangers in the fairway between some of the islands. 40

Patola, with a depth of 11 feet (3^m4), sometimes marked by surf and usually by discoloration, lies about 1½ miles east-south-eastward of the northern extremity of Tagaja.

Anchorage.—Anchorage may be obtained by vessels with local knowledge, in a depth of about 16 fathoms (29^m3), southward of the mouth of Sungei Roekoe, on which Roekoe village stands, about 2½ miles south-eastward of Tanjong Loeari; there is anchorage for vessels with local knowledge, in a depth of 16 fathoms (29^m3), outside the detached shoals, off Wari village, about 3½ miles south-eastward of Roekoe, and there is a sheltered anchorage for vessels with local knowledge, in a depth of 14 fathoms (25^m6), off Mawea village, abreast Miti, the southernmost island of the Tobelo group. This anchorage may be reached by passing northward of Miti; the shoals here are marked by discoloration. 50

Chart 2787, plan of Tobelo road.

Reede Tobelo. — Dangers. — Beacons. — This roadstead lies between Koemoe (Kumu), an island of the Tobelo group, lying about three-quarters of a mile south-westward of Kakara lamo, and Tobelo village, on the coast of Halmahera.

The limit of the roadstead is the arc of an imaginary circle, with a radius of 6,890 feet (2100^m0) and the head of the southern pier as centre.

A detached reef, which dries, marked by an unofficial beacon surmounted by a truncated cone, on its northern edge, lies about 4 cables south-eastward of Koemoe. The edge of the reef fringing the southern side of Koemoe is marked by two unofficial beacons, each surmounted by a rectangle. Oeboe Oeboe (Ubu Ubu) is an islet lying on a detached reef, which dries, the northern extremity of which is marked by a beacon surmounted by a truncated cone, on the south-eastern side of the roadstead. A detached reef, close south-eastward of Oeboe Oeboe, is marked by a beacon surmounted by a truncated cone on its north-eastern extremity and by a beacon surmounted by a ball on its south-eastern extremity; a shoal close northward of the reef on which Oeboe Oeboe lies, is marked by a beacon on its southern side.

There are two piers at Tobelo; the northern, about 2 cables westward of Tanjong Pilawana, has a depth of 8 feet (2^m4) alongside. The southern pier, off Tobelo village, is the landing place for boats, and always has a sufficient depth alongside.

Tobelo is the headquarters of a Government official. Provisions, except meat and fish, are scarce.

There is a building with a conspicuous zinc roof near the southern end of Tobelo, near the root of the southern pier.

Vessels should approach the roadstead by passing between the south-eastern side of Koemoe and the detached reef, marked by a beacon, south-eastward of it, thence north-eastward of Oeboe Oeboe, thence between the two beacons northward of it and steer for the southern pier. The shoals are of a light-brown colour and can be plainly seen.

Large vessels may obtain anchorage, in depths of from 8 to 10 fathoms (14^m6 to 18^m3), southward of Oeboe Oeboe.

Chart 2787, plan of Kau bay.

KAOE BAAI.—Kaoe (Kau) baai, which separates the northern part of Halmahera from its north-eastern peninsula, is entered between Tanjong Patjikara (Pachikara), situated about 13½ miles southward of Tanjong Gorango (*Lat.* 1° 32' N., *Long.* 128° 02' E.), and a point about 5½ miles east-south-eastward. The head of the bay is separated from Dodinga baai (page 53), on the western side of Halmahera, by an isthmus, on which there are some hills, about 650 feet (198^m1) high. The western shore is mostly low, the eastern shore is higher and steep.

Bobalé, a low island with high trees on it, lies in the entrance on the western side of the fairway.

The plain southward of Togohi, mentioned on page 75, continues southward to the Mata Mata gebergte, within the western side of Kaoe baai, of which the most conspicuous peaks are Tabobo or Kasteelberg, 3,046 feet (928^m4) high, and Oosttop (East Summit), 1,750 feet (533^m4) high, 9½ miles eastward. On the eastern side of Kaoe baai is the high peninsula which separates it from Boeli baai. The summit (chart 2788) of a ridge, 3,801 feet (1158^m5) high, situated about 15 miles east-north-eastward of the eastern entrance point of Kaoe baai, is conspicuous.

Charts 2788, 943, 942a, 1263.

Chart 2787, plan of Kau bay.

Papoedoe, 1,366 feet (416^m4) high, about 8 miles eastward of the same point, is an isolated, moderately flat hill, which does not show up well against the higher land behind. Soebaim (Subaim), 3,748 feet (1142^m4) high, and conical, with craters on its north-eastern and south-western sides, and Wato Wato, 4,834 feet (1473^m4) high, which slopes gradually, lie about 10 miles south-south-westward and 13½ miles southward, respectively, of Tanjong Lolobata, situated about 3 miles southward of the eastern entrance point of Kaoe baai. 5

Outer part of Kaoe baai.—In the passage between Bobalé and the eastern side of the entrance there is a ridge with a least depth of 21 feet (6^m4) in the middle, but there is a deep channel on either side. A 33-foot (10^m1) patch lies about 1½ miles southward of Bobalé. In the passage between Bobalé and the western shore there are several shoals, with depths of from 6 to 17 feet (1^m8 to 5^m2). Large vessels should not use this passage. 15

The western side of the bay from the entrance to Tanjong Boleo, about 12 miles south-south-westward, is bordered by coconut plantations. There is a conspicuous light-coloured house at Gamlaha village, about 4 miles south-westward of Tanjong Patjikara. About one mile northward of Tanjong Boleo is Kaoe village, the headquarters of a district chief. There is a pier here, which is approached through a channel from northward close along the shore; the northern end of the channel is indicated by a white screen about half a mile northward of the pier. The bank which forms the eastern side of the channel is usually marked by unofficial stakes. 25

Anchorage.—Anchorage may be obtained off Bobalé village, on the southern side of Bobalé, in a depth of about 10 fathoms (18^m3), sand, about 2 cables offshore; this anchorage is moderately calm even in the southerly monsoon. 30

Anchorage may be obtained, in a depth of about 4½ fathoms (8^m2), sand and mud, about one mile eastward of the pier-head at Kaoe, taking care to avoid the 13-foot (4^m0) patch about 8 cables offshore.

Anchorage may be obtained anywhere in Baai van Waisilé, on the eastern side of Kaoe baai, close inside the entrance, in depths of from 16 to 22 fathoms (29^m3 to 40^m2), mud and sand. 35

Inner part of Kaoe baai.—The inner part of Kaoe baai, in which the shores can be safely followed at a distance of one mile, is seldom visited; it is open to both monsoons, and the sea quickly rises. Between Tanjong Boleo (*Lat.* 1° 09' N., *Long.* 128° 54' E.) and Ake lamo village, about 18 miles south-westward, the western shore is low, rising within to Mata Mata gebergte. Close northward of this village there is a conspicuous plain, covered with reeds. About 16 miles southward of Ake lamo village there is a peak (chart 2788), 2,692 feet (820^m5) high, which appears as a blunt cone. 45

Roni, 546 feet (166^m4) high, is a conspicuous islet lying close off the eastern shore about 6 miles south-south-westward of Tanjong Tobalien, situated about 11 miles south-westward of Tanjong Lolobata. About 7 miles south-eastward of Roni is the northern end of a conspicuous ridge which extends about 10 miles southward to Saolat (chart 2788), 4,690 feet (1429^m5) high; between this ridge and the coast there is a low plain. 50

Anchorage.—Sheltered anchorage may be obtained by vessels with local knowledge during the northerly monsoon, off Wangeotak and

Chart 2787, plan of Kau bay.

Malifoet villages, in Bocht van Loleo lamo, about 4 miles westward of Tanjong Boleo. Kaoe rivier flows out between Tanjong Boleo and Wangeotak, and from its mouth, a spit, with depths of less than 6 feet
 5 (1^m8), and steep-to, extends about 1½ miles offshore. A steamboat can enter the river at high water.

Chart 2787, plan of Bobane bay.

Good anchorage may be obtained in mid-channel, in a depth of 6½ fathoms (11^m9), in the eastern part of Bobané baai, situated on the
 10 north-eastern side of the isthmus connecting Kaoe baai with Dodinga baai, with the pier at Bobané Igoe (Igu) village, bearing about 169°. Pasir Poetih (Putih) village stands about 8 cables eastward of Tanjong Tanoe (Tanu), the eastern entrance point of the bay.

Chart 2787, plan of Kau bay.

15 Anchorage may be obtained by vessels with local knowledge, in a depth of 22 fathoms (40^m2), mud and sand, south-westward of Aké Selaka or Babing, an islet lying close offshore about 2 miles north-north-eastward of Roni. Aké Selaka village is situated on the coast close south-eastward of the islet. A reef, with a least depth of 3 feet
 20 (0^m9), not marked by discoloration, was reported, in 1939, to lie one mile north-westward of the islet Aké Selaka, and about 4½ cables offshore.

Anchorage may be obtained by vessels with local knowledge off several villages on the south-eastern shore of Kaoe baai. Off Ekor, on the southern shore, there is anchorage, with the village bearing 180°,
 25 and a white patch, 105°. Landing can be effected at high water in the small river which flows out here. There is an extensive low plain between Ekor and Pintatoe village, about 5½ miles westward.

Charts 2787, plan of Kau bay, 2788.

Directions.—A vessel approaching Kaoe baai from northward
 30 should pass about 2 miles eastward of Miti, and then steer for Bobalé. Batu Koeboe (Kubu), on which there is a white patch, about 4½ miles southward of Tanjong Gorango (*Lat.* 1° 32' N., *Long.* 128° 02' E.), is a good mark. About 3½ miles farther southward is Tanjong Toenowé (Tunowe), from which a small bank extends, which causes tide-rips.
 35 *Chart 2788.*

The usual entrance to Kaoe bay is eastward of Bobalé, but a vessel should not pass over the ridge in the middle, as it has not been closely examined and less depths may exist. A stream with a maximum rate of 1½ knots has been observed to set through the channel on either side
 40 of Bobalé.

COAST.—The coast between Tanjong Lolobata and Tanjong Lelai, 43 miles north-eastward, is partly bordered by cliffs, and the greater part rises steeply to high land close within. The coastal reef, which only fringes this stretch in places, is generally narrow.

45 The mountains north-eastward of Kaoe baai afford the principal landmarks for a vessel proceeding south-eastward from Straat Morotai. Besides the ridge east-north-eastward of the entrance to Kaoe baai, described on page 76, Iga, 2,413 feet (735^m5) high, Tatem, 3,125 feet (952^m2), and Bobolo, 1,763 feet (537^m4), situated about 15, 25 and
 50 31 miles, respectively, north-eastward of Tanjong Lolobata, are good marks. Watida, which has a double peak, about 2,977 feet (907^m4) high, and the peaks close eastward of it, about 11½ miles south-westward of Tanjong Lelai, the north-eastern extremity of the peninsula, are

Charts 943, 942a, 1263.

Chart 2788.

visible over the hilly land to a vessel a few miles offshore, especially from northward.

Anchorage.—Anchorage may be obtained by vessels with local knowledge, in a depth of about 18 fathoms (32^m9), about 1½ miles north-eastward of Njaoelakoe (Nyaulaku) village, on the northern end of the eastern entrance point of Kaoe baai. There is good anchorage off Iga village, about 15 miles north-eastward of Njaoelakoe, and in Bobolo baai, about 14 miles farther north-eastward, in a depth of about 20 fathoms (36^m6), about half a mile offshore, with the eastern Bobolo peak, 1,698 feet (517^m6) high, bearing about 169°.

HALMAHERA SEA.—Halmahera sea lies between the eastern side of Halmahera and the meridian of 129½° E. The northern part is separated from the southern part by Djailolo passage (page 82).

The current in Halmahera sea is not strong, and depends on the direction and force of the wind.

Coast.—Tanjong Lelai, which is low, is fringed by a reef, which dries, extending north-eastward for nearly 1½ miles. To a vessel off the eastern coast of Halmahera southward of this point, Watida, which appears as a sharp peak from eastward, the peaks eastward of it, and the flat peak, 2,738 feet (834^m6) high, about 3½ miles south-south-eastward of Watida, are conspicuous. Tanjong Petak, about 11 miles southward of Tanjong Lelai, can be identified by a flat double-peaked hill, 483 feet (147^m2) high, close within it, which appears as an islet from a distance. About 5 miles south-south-westward of Tanjong Petak there is a conspicuous hill, 792 feet (241^m4) high, close within the coast. Thence to Tanjong Wajamli, about 11½ miles southward, there is a chain of coastal hills, over which the peaks of Watam gebergte, about 9 miles inland, are visible.

Current.—The current due to the monsoons may set with some strength along this coast, especially off the prominent points. Westward of Tanjong Lelai the current follows the direction of the coast.

Anchorage.—**Dangers.**—Anchorage may be obtained by vessels with local knowledge, in depths of from 14 to 16 fathoms (25^m6 to 29^m3), in Dabo baai, entered about 3 miles southward of Tanjong Lelai (Lat. 1° 35' N., Long. 128° 43' E.). Karang Patliang, with a least depth of 11 feet (3^m4), marked by discoloration or surf, lies about three-quarters of a mile eastward of Tanjong Patliang, the south-western entrance point of the bay, and a rock, with a depth of 8 feet (2^m4), lies between them. There is better anchorage in Ake lamo baai, entered between Tanjong Patliang and Tanjong Petak. Ake lamo village stands on the shore of the bay about 2½ miles southward of Tanjong Patliang.

There is anchorage for vessels with local knowledge off Tifonis village, about 3 miles southward of Tanjong Petak, north-westward of a sandbank, which dries. Small craft with local knowledge can anchor between the sandbank and the coast.

Chart 2787, plan of Buli bay.

BOELI BAAI.—**Dangers.**—Boeli (Buli) baai, entered between Tanjong Wajamli (Wayamli) and Tanjong Inggelang, about 31 miles southward, is backed by high land; over the greater part it is encumbered with dangers, and is practically only navigable for vessels bound

Chart 2787, plan of Buli bay.

for Boeli (Buli) village, on its northern shore, about 27 miles west-south-westward of Tanjong Wajamli.

- Tanjong Wajamli is low, but rises to Onat, 1,383 feet (421^m5) high, about 2½ miles within. The mountains along the northern side of the bay have no conspicuous features.

Chart 2788.

- On the southern side the most conspicuous peaks from west to east are :—the summit of Waleh gebergte, 2,140 feet (652^m3) high, about 25 miles westward of Tanjong Inggelang, Bial, Foni, Damoli and Tadjam (Tajam), which is conical, all lying within 13 miles of the same point. See view facing this page.

Chart 2787, plan of Buli bay.

- The only villages on the northern side of the bay are Watam and Wajamli, situated about 3½ and 13 miles west-south-westward, respectively, of Tanjong Wajamli.

- Sailal, with a depth of 6 fathoms (11^m0), lies about 1½ miles south-eastward of Tanjong Wajamli. Semar, with a depth of 15 feet (4^m6), lies about 1½ miles eastward of Tanjong Mokali, situated about 11½ miles west-south-westward of Tanjong Wajamli. Metonga or Gareel riffen are two patches, with depths of 3 and 16 feet (0^m9 and 4^m9), lying about 3½ miles south-south-eastward of Tanjong Mokali. Between Tanjong Mokali and Boeli village there are a number of off-lying reefs, the positions of which may best be seen on the chart. Litin, which dries, situated about 5 miles eastward of Boeli village, is well marked by discoloration.

- On the southern side of Boeli baai there are several unimportant villages. Inggelang, which is covered with high vegetation, is the largest of three low islets lying close north-westward of Tanjong Inggelang, and on the southern side of this island there is a village of the same name with a small pier. About 2½ miles northward of Pulau Inggelang is Woto, an islet covered with high vegetation. Wor is an islet lying about 5½ miles westward of Woto.

- Anchorage.**—Anchorage may be obtained by vessels with local knowledge anywhere off the northern shore of Boeli baai, the principal anchorage being in Reede Boeli, off Boeli village (*Lat.* 0° 53' N., *Long.* 128° 17' E.), which is the headquarters of a district chief and shipping place for copra and forest produce.

- Anchorage may be obtained, in a depth of about 5 fathoms (9^m1), sheltered during the South-east monsoon, westward of Tjef (Chef), an islet close westward of Pulau Inggelang. Small craft with local knowledge may obtain a sheltered anchorage off Inggelang village, but the channel southward and westward of Inggelang is narrow and dangerous.

- There is anchorage for vessels with local knowledge northward of Bitjoli (Bicholi) village, about 10½ miles west-north-westward of Tanjong Inggelang, in a depth of about 10 fathoms (18^m3). During the North-west monsoon it is better to anchor under the lee of Wor, in a depth of about 15 fathoms (27^m4). The best landing place is close eastward or westward of Bitjoli village.

There is always a safe anchorage for vessels with local knowledge off Maba village, about 15 miles north-westward of Bitjoli village. The shores of Sololo baai, at the head of Boeli baai, are uninhabited.

Directions for Reede Boeli.—A vessel approaching Boeli baai from

Charts 2788, 943, 942a, 1263.

To face page 80.

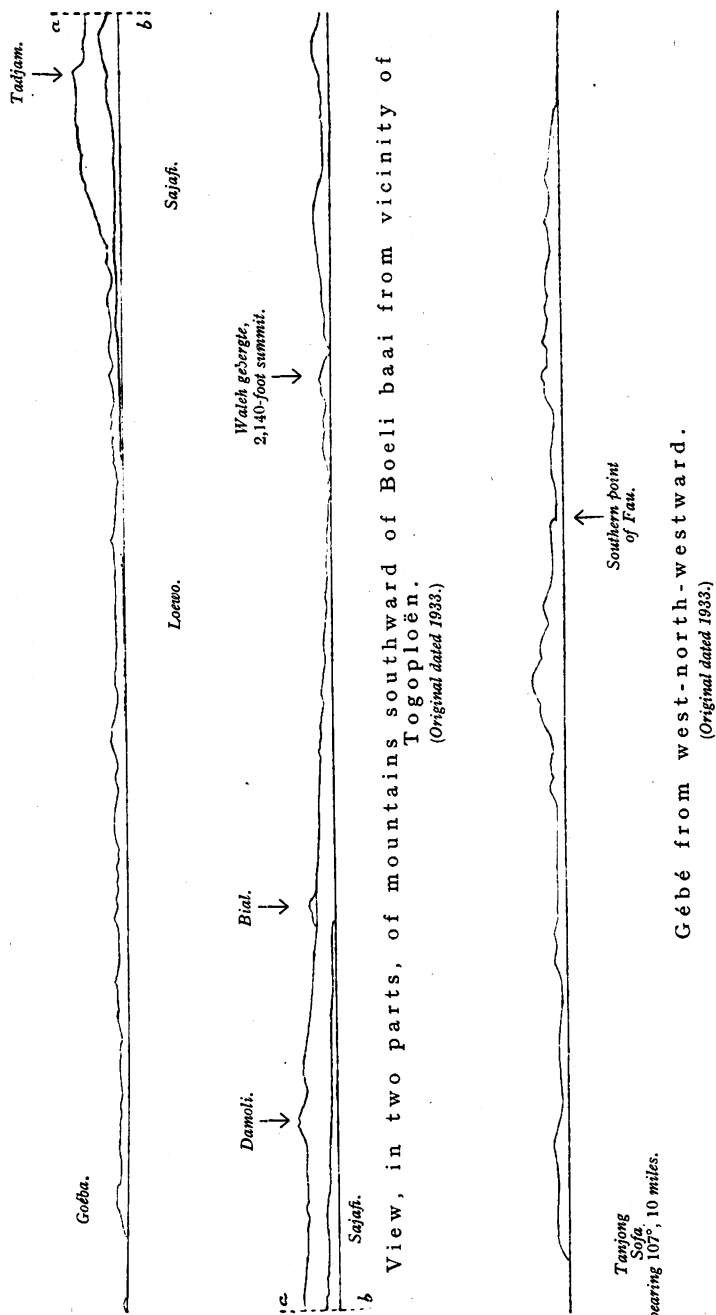


Chart 2787, plan of Buli bay.

northward can round Tanjong Wajamli at a short distance and pass between it and the reef Sailal, thence she should keep about 2 miles off the northern shore, passing southward of the reef Semar and between Tanjong Mokali and Metonga riffen, thence she should steer to pass southward of Litin, a reef which dries, and thence for the anchorage, which is in a depth of from 11 to 14 fathoms (20^m1 to 25^m6), westward of a $4\frac{1}{2}$ -fathom (8^m7) patch and about three-quarters of a mile south-south-eastward of a conspicuous shed, which stands near the pier at Boeli village. The channel which leads to the pier between the reefs, 10 which dry, is marked by unofficial beacons.

A vessel approaching Boeli baai from eastward should steer to pass northward of Leleve and Sain, situated about $13\frac{1}{2}$ and 17 miles, respectively, north-westward of Tanjong Inggelang, thence southward of Ronde rif, an atoll-shaped reef, which dries, marked by discoloration, 15 about 5 miles west-north-westward of Sain, thence she can steer for the anchorage off Boeli village.

A vessel approaching from southward should give Tanjong Inggelang a good berth, thence steer to pass between Pulau Inggelang and Woto, thence southward of Wor, taking care to clear the 8-foot (2^m4) patch 20 lying about half a mile south-westward of the islet, thence she should steer to pass eastward and northward of Mia, an islet about $3\frac{1}{2}$ miles north-westward of Wor; Pinit and Toppo, reefs which dry, lying northward of Mia, are marked by discoloration. Thence there is a clear channel to Reede Boeli, passing westward of Woi, a reef which 25 dries, marked by discoloration, about 4 miles north-north-westward of Mia, and westward of Ronde rif.

Tidal streams.—Current.—Within Boeli baai, only weak tidal streams are experienced. Outside the bay, during the South-east monsoon, the tidal stream is not felt, but a current sets north-north- 30 westward, attaining a maximum rate of 2 knots. In the channel southward of Pulau Inggelang the current runs at the rate of $1\frac{1}{2}$ knots. Strong tide-rips, which sometimes break, occur off Tanjong Inggelang and Tanjong Wajamli.

Chart 2788.

Off-lying islands and dangers.—An extensive bank, with depths of less than 100 fathoms (182^m9), on which there are a number of islets and shoals, lies in the eastern approach to Boeli baai. Close off the south-western side of this bank, about 14 miles east-north-eastward of Tanjong Inggelang (*Lat. $0^\circ 33' N.$, Long. $128^\circ 41' E.$*), there is a smaller 40 bank, with a least depth of 29 feet (8^m8). On the north-western edge of the extensive bank, 17 miles north-eastward of Tanjong Inggelang, there is a 39-foot (11^m9) patch. Canton Packet, a rock which dries, lies about $2\frac{1}{2}$ miles eastward of the 29-foot (8^m8) shoal, and about 6 miles farther eastward is Togoploën or Recovery islet, 77 feet (23^m5) high, 45 almost devoid of vegetation, which, from a distance, appears as a vessel. Jiew or Katharine islet, 188 feet (57^m3) high, thickly covered with vegetation, lies about $7\frac{1}{2}$ miles north-eastward of Togoploën. There is a high rocky islet, covered with vegetation, lying close off the eastern side of Jiew, and a rocky islet close off its north-western extremity. 50

Aurora bank, about 23 miles eastward of Jiew, and the banks farther eastward are described on page 193.

Sajafi (Sayafi), an island, 405 feet (123^m4) high, lies about $7\frac{1}{2}$ miles eastward of Tanjong Inggelang, with a clear passage in the fairway

Charts 943, 942a, 1263.

Chart 2788.

between, but there is a $6\frac{1}{2}$ -fathom (11^m9) patch lying nearly one mile westward of the north-western part of the island. Loewo (Luwo), which is lower than Sajafi, lies nearly one mile south-south-eastward of it; it is fringed by a drying reef, which extends about three-quarters of a mile from its south-eastern side.

Coast.—The peninsula which forms the south-eastern side of Boeli baai terminates in a hilly ridge at Tanjong Ngolopopo, a steep rocky point about 25 miles south-south-eastward of Tanjong Inggelang. 10 The most conspicuous summit of the ridge is Goéba, 972 feet (296^m3) high, which, from north-eastward, appears as a small table mountain, situated about $3\frac{1}{4}$ miles north-westward of Tanjong Ngolopopo; between them there is a hill, 533 feet (162^m5) high, which is fairly conspicuous.

The coast between Tanjong Inggelang and Tanjong Ngolopopo is 15 very steep. The only places where vessels with local knowledge can obtain anchorage are in the small bight about $3\frac{1}{4}$ miles southward of Tanjong Inggelang, in a depth of 13 fathoms (23^m8), where there are a few houses; off Paniti village, close southward of Tanjong Loet (Lut), about 5 miles farther southward, where temporary anchorage may be 20 obtained, in a depth of 13 fathoms (23^m8); and off Tepeleu and Gemia villages, about 12 and $10\frac{1}{2}$ miles, respectively, north-westward of Tanjong Ngolopopo, in a depth of about 16 fathoms (29^m3).

Djailolo passage.—Djailolo (Jailolo) passage is the deep channel lying between Moeor (Muor), an island, 280 feet (85^m3) high, about 25 $2\frac{1}{2}$ miles south-eastward of Tanjong Ngolopopo, and Gébé, an island about 20 miles south-eastward.

Weilon, a rocky islet, lies on the drying reef which fringes the south-eastern extremity of Moeor. Witimdi are two flat rocks, a few feet high, lying in the middle of the channel between Tanjong Ngolopopo 30 and Moeor, with a deep channel on either side of them.

From southward, Moeor and the hill Goéba appear wedge-shaped, the steep side of each facing westward; as Goéba appears in view long before Moeor, it may be mistaken for the island. When closer in, the eastern slope of Goéba may be mistaken for Tanjong Ngolopopo 35 (*Lat. $0^{\circ} 13' N.$, Long. $128^{\circ} 54' E.$*), and the 533-foot (162^m5) hill for Moeor. *Charts 2788, 942b.*

Gébé has a double-peaked hill, named El Fanoem, 933 feet (284^m4) high, about $9\frac{1}{2}$ miles south-eastward of Tanjong Sofa, the north-western extremity of the island, and near its south-eastern extremity 40 it attains an elevation of 1,245 feet (379^m5) in a peak in the shape of a truncated cone. See view facing page 80.

For further description of Gébé and islands south-eastward of it, see page 88.

Tidal streams.—In the vicinity of Tanjong Sofa there are strong 45 tidal streams, with whirlpools and tide-rips, and also off the south-eastern extremity of Gébé, but here they are less strong. In the passage between Tanjong Ngolopopo and Moeor the streams are sometimes very strong, and cause heavy tide-rips. During the transition periods of the monsoons, regular and moderate tidal streams, 50 setting north-west and south-east, have been observed northward of Tanjong Ngolopopo.

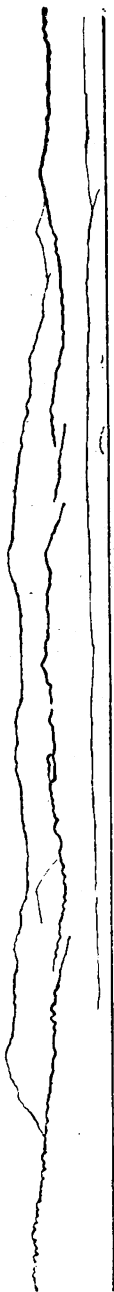
Chart 2788.

WEDA BAAI.—Weda baai is the large indentation between the

Charts 942a, 1263.

To face page 83.

N.W. summit
of Waleh,
2,140 feet.



Baai van Kokka.—Karang Mela in line with the north-western summit of
Waleh, bearing 047° .
(Original dated 1933.)



Weda baai.—Widi eilanden, bearing between 321° and 340° .
(Original dated 1933.)

Chart 2788.

south-eastern and southern peninsulas of Halmahera. Except for Veldman klip (page 85), north-eastward of the Widi eilanden, there are no dangers outside a distance of 6 miles from the shore.

Northern side of Weda baai.—Dangers.—The mountainous land on the northern side of Weda baai has been described on page 80. Tadjam can be easily identified from south-eastward, southward and south-westward. Bial can be identified by its steep western slope; thence westward there is lower land as far as the high ridge which extends north-westward from Waleh gebergte. The so-called north-western peak of the Waleh gebergte (*see view facing this page*) is conspicuous from south-westward owing to its steep north-western side. Westward of it and about 3 miles inland, is Sagea, 2,764 feet (842^m5) high, which appears as a dome from south-eastward; on the coast, southward of it, there is a dark-coloured hill, 687 feet (209^m4) high, which shows up well and appears as an island when approaching from southward. This hill is one of the few landmarks which is unmistakable. About 4½ miles north-north-westward of Sagea is Liember with two conical peaks, the higher of which has an elevation of 4,138 feet (1261^m3), but they are often obscured by clouds. Thence there is a valley behind the north-western extremity of the bay.

The coastal reef and the detached reefs, which dry, are marked by discoloration when the light is favourable; the water is always clear. Karang Legli consists of two patches, with a depth of 6 feet (1^m8), lying about 5 miles west-north-westward of Tanjong Ngolopopo and about 1½ miles off the northern shore.

Reede Patani or Gamsong, situated off Patani village, about 9 miles north-westward of Tanjong Ngolopopo, affords anchorage to vessels with local knowledge, in a depth of about 30 fathoms (54^m9), with the small landing pier bearing about 315°, and the south-western extremity of Moeor in line with the coast north-westward of Tanjong Ngolopopo (*Lat. 0° 13' N., Long. 128° 54' E.*), bearing about 117°. The village is not easy to identify from a distance, but on closing it, a mosque with a white roof, behind a sandy beach, will be seen.

A shoal, with a depth of 6 feet (1^m8), lies about 1½ cables offshore south-eastward of the mosque. About 1½ miles farther westward and 4 cables offshore there is a reef, which dries.

Communication with the shore is sometimes difficult, but there is a sheltered anchorage at all times in Reede Mesa and Baai van Kokka.

Between Patani and Mesa village, about 30 miles west-north-westward, the coast is sparsely inhabited. Between Tanjong Remdi, situated 12½ miles west-north-westward of Patani village, and Mesa there are a number of off-lying reefs, the outermost of which is Karang Mie (Mi), which dries, about 7 miles west-north-westward of Tanjong Remdi. About 5 miles north-westward of the same point and about three-quarters of a mile offshore, is Karang Matalael, which dries; and about 2½ miles farther westward and about one mile offshore, is Karang Samlowos. A 3-foot (0^m9) patch lies about half a mile south-eastward of the eastern extremity of Karang Samlowos. There is a clear deep channel between Karang Mie and the reefs inside it.

Karang Mela, which dries, lies about 3 miles westward of Karang Samlowos and about one mile offshore. About half a mile north-eastward of Karang Mela there is a 5-foot (1^m5) patch.

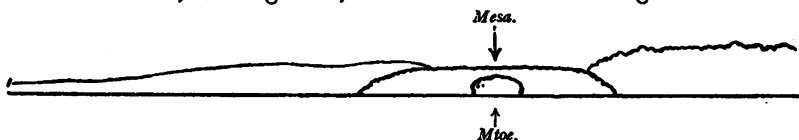
Chart 2788.

Between Tanjong Bone, situated about 9 miles north-westward of Tanjong Remdi, and Mesa village, there are three hills near the coast, which are good marks, the westernmost and highest of which has an elevation of 926 feet (282^m2); this hill is the south-easternmost of three peaks, lying close together, of a densely wooded ridge.

Chart 2787, plan of Mesa road.

Reede Mesa.—This roadstead, close eastward of Mesa village, affords anchorage, in a depth of about 14 fathoms (25^m6), sand. Mesa and Mtoe (Mtu) are low islets, with high trees, from which reefs, which dry, extend southward, lying south-eastward of the village; these reefs are not always marked by discoloration when covered. The village is difficult to distinguish from the anchorage; it can be reached by boats through a narrow shallow channel between the coast and the islet Mesa.

A vessel should approach the roadstead with the 926-foot (282^m2) hill (chart 2788), mentioned above, bearing 330°, until the islet Mesa is in line with Mtoe, bearing 280°, when she can steer along the coast to



Reede Mesa.—Mtoe in line with Mesa,
bearing 280°.

(Original dated 1933.)

the anchorage. When the reefs can be plainly seen, the vessel may approach from southward and pass between the islets Mesa and Mtoe.

Chart 2787, plan of Kokka bay.

Baai van Kokka.—Dangers.—This bay is entered between Tanjong Waleh, situated about 7 miles west-north-westward of Mesa village, and a point about 3½ miles farther in the same direction. Sepa village stands on the north-western shore, and at its eastern end there is a conspicuous house.

Karang Mela, which dries, lies about 2½ miles westward of Tanjong Waleh (Lat. 0° 26' N., Long. 128° 11' E.), and about one mile farther westward there is an 8-foot (2^m4) patch. There are two reefs which dry, lying within half a mile southward of the conspicuous house, and between them and the coast there is a clear deep channel. A 3-foot (0^m9) patch lies about 2 cables eastward of the larger of the two reefs.

Anchorage may be obtained in the vicinity of the reefs southward of Sepa village, in depths of from 16 to 22 fathoms (29^m3 to 40^m2). During the southerly monsoon a calmer berth can be obtained in the north-eastern part of the bay, in similar depths, northward of Tête, a low island covered with mangroves, situated close offshore north-north-westward of Tanjong Waleh. Care must be taken to avoid the 15-foot (4^m6) patch, which is sometimes only slightly marked by discoloration, lying close northward of Tête.

Chart 2788.

Coast.—About 1½ miles westward of Sepa is Sagea village, off which anchorage may be obtained by vessels with local knowledge during the northerly monsoon and transition periods, in a depth of about 19 fathoms (34^m7). A small mountain stream flows into the sea here.

Between Sagea and Tanjong Oeli (Uli), a steep and rocky point, about 7½ miles westward, the coast is uninhabited.

Charts 942a, 1263.

Chart 2788.

Tidal streams.—The tidal stream sets westward along the northern shore of Weda baai with the rising tide, and eastward with the falling tide.

Western side of Weda baai.—The western side of Weda baai is, 5 like the northern side, mountainous, and densely wooded. A number of shoals, not always marked by discoloration, lie off this coast, and consequently caution is necessary when approaching it.

Tanjong Libobo can be identified by the hill of the same name, 566 feet (172^m5) high, about 2 miles within its extremity, and by Babi, 10 a low wooded islet thickly covered with vegetation, close south-eastward of the point. About 30 miles north-westward of Tanjong Libobo there are two conspicuous rounded mountains, 1,117 feet (340^m5) high. The mountains on the western side of the peninsula have been described on page 66. *See view facing page 70.* 15

Tidal streams.—The tidal streams along the western shore of Weda baai are weak in the northern part, but are stronger in the southern part and in the vicinity of the Widi eilanden. They set northward with the rising tide, and southward with the falling tide. The streams in the vicinity of Tanjong Libobo may be strong, and when 20 they are opposed by the wind, cause a rough sea.

Off-lying islands and dangers.—Widi eilanden, lying in the southern entrance of Weda baai, consist of several low islands, some of which are covered with high trees and others with mangroves, lying on 25 two extensive reefs, which dry, on the edges of which there are coral rocks, with white sand inside them. *See view facing page 83.*

The principal islands on the south-eastern reef are Vroolijk, Zand, and Drijvers or Kapoeratja, and on the north-western reef are Verloren, Schraal or Daga, and Moelrijk. Vaarwel or Dodora lies about 2 miles south-westward of the south-eastern reef, and Droevig or Dadawe lies 30 close southward of Moelrijk. There is a clear deep passage between the two reefs, and between them and Vaarwell and Droevig. There is no convenient anchorage, and there are no permanent inhabitants.

Veldman klip is a small coral reef, with a depth of 2 feet (0^m6), always well marked by discoloration, lying about 8 miles north-north- 35 eastward of Drijvers.

Coast.—Between Gané di loear, about 19 miles north-westward of Tanjong Libobo (*Lat. 0° 55' S., Long. 128° 27' E.*), and Tanjong Foja (Foya), about 52 miles farther northward, there is a beach. Djodji (Joji), an islet lying close offshore, 16½ miles north-north-westward of 40 Gané di loear, is covered with coconut trees and is conspicuous. About 3 miles north-eastward of it is Soenam (Sunam), a rocky islet with high trees on it; it is infested with large snakes and bats. Wamlonga, close offshore, about 11 miles north-north-westward of Djodji, is an islet covered with mangroves. Anchorage may be obtained by vessels with 45 local knowledge anywhere along this coast, but it is advisable to approach on a westerly course.

Chart 2787, plan of Foya road.

Reede Foja.—Dangers.—This roadstead is situated off Foja village, about 3½ miles south-westward of Tanjong Foja. There are 50 several reefs, which dry, fronting the village, of which Batjam Silloem (Bacham Sillum) is the outermost. There are a number of patches, with depths of from 3 to 10 feet (0^m9 to 3^m0), lying northward of the reefs, and some with depths of from one to 18 feet (0^m3 to 5^m5) south-

Chart 2787, plan of Foja road.

south-eastward of Tanjong Mafa, about $1\frac{1}{2}$ miles southward of Foja village.

- Good anchorage may be obtained in the roadstead. A vessel approaching from eastward should not bring Tanjong Foja to bear less than 278° on account of the shoals eastward of that point, which consist of a 3-foot (0^m9) patch at a distance of about $2\frac{1}{2}$ miles, and a 26-foot (7^m9) patch about 4 cables northward of it.

- Small vessels may obtain a more sheltered anchorage northward of the tongue of coastal reef, which dries, inside the detached reefs, which dry. During the southerly monsoon, however, communication with the shore is frequently interrupted.

Foja village is the headquarters of a district chief.

Chart 2788.

- Coast.—Off-lying dangers.**—The mountain peaks near the middle of the peninsula westward and north-westward of Foja have been described on page 54. Between Tanjong Foja and Tanjong Silota, about 10 miles northward, the coast is fringed by a drying reef, which extends three-quarters of a mile offshore in places, and there are a number of detached reefs, which lie as much as $5\frac{1}{2}$ miles offshore. Karang Elmoos (Elmos), the easternmost, is an atoll, in the lagoon of which there is a depth of about 35 fathoms (64^m0). About midway between it and the coast is Karang Lle Heep. Karang Glop Mellopo lies about 4 miles south-south-eastward of Tanjong Silota and about 3 miles offshore. Karang Lle Glogos lies about $3\frac{1}{2}$ miles south-eastward of the same point. There are other dangers inside these reefs, but there is a deep channel between them and the coast. Mof is a rock on the coastal reef about 4 miles northward of Tanjong Foja, and is a good mark for vessels using this inshore passage.

- When the reefs are plainly visible, vessels should proceed into and out of the inside passage by passing close southward of Karang Elmoos.

- Tanjong Silota (*Lat.* $0^{\circ} 17' N.$, *Long.* $127^{\circ} 55' E.$) is rocky on its northern side, and is rendered conspicuous by the islet of the same name lying on the coastal reef close southward of the point. Several rocks lie close off the coastal reef within one mile south-eastward of the point.

Chart 2787, plan of Weda road.

- Reede Weda.—Dangers.—Beacons.**—This roadstead is situated off Weda village, about 4 miles north-westward of Tanjong Silota. Kolo eilanden, the most important of which are Jef (Yef) and Koelefoe (Kulefu), lie close offshore north-eastward of Weda village. Jef is saddle-shaped, the northern peak being 313 feet (95^m4) high, and steep on its western side. The eastern side of Jef is fringed by a reef, which dries; on the south-eastern side of this reef there is a rock and on its north-eastern side there are two islets. The southern edge of the reef is marked by two unofficial beacons, each surmounted by a rectangle.

- Koelefoe, about half a mile south-westward of Jef, is 169 feet (51^m5) high, and covered with coconut trees; it is fringed by a reef, which dries, the edges of which are marked by a number of unofficial beacons.

- A reef, with a depth of 3 feet (0^m9), marked by discoloration, and by an unofficial beacon on its south-western side, lies $6\frac{1}{2}$ cables south-eastward of Koelefoe, and two reefs marked by beacons lie within 3 cables southward of the island.

Telok Maidi, in which lies Maidi, a low islet fringed by a reef which dries, is the bight between Jef and the mainland; there is a deep

Chart 2787, plan of Weda road.

channel on either side of the islet. The edge of the reef, which dries, extending from the western side of the entrance to Telok Maidi is marked by unofficial beacons. A rock, covered with vegetation, lies on the extensive coastal reef, which dries, about half a mile north-north-
westward of Maidi. 5

The limits of the roadstead are the parallels through the southern point of the islet Maidi, and the point 3,281 feet (1000^m0) southward of the flagstaff, and the meridian through the eastern extremity of Jef.

Telok Gaah, northward of Jef, is approached through a narrow 10 channel in the coastal reef, on which there are several islets. Fronting its entrance there is a coral reef, with a depth of 3 feet (0^m9). The shores of the bay are covered with mangroves. The bay can only be entered at low water or when the reefs are plainly visible.

Chart 2788.

Off-lying danger.—Beacon.—Karang Pasir Tidore, which dries, lies about 5 miles north-eastward of Tanjong Silota; it is marked on its northern side by an unofficial beacon, surmounted by a black cone. A reef, with a depth of 6 feet (1^m8), lies about 1½ miles westward of Karang Pasir Tidore. 15

Charts 2787, plan of Weda road, 2788.

Anchorage.—Directions.—Anchorage may be obtained in Reede Weda, in a depth of about 19 fathoms (34^m7), coral, southward of Koelefoe, with the rock on the coastal reef, which dries, north-north-
westward of Maidi, bearing about 004°, just open westward of the 25 western extremity of Koelefoe, but this berth is exposed to the southerly monsoon.

Small vessels will find better shelter between Koelefoe and the coast, opposite the landing pier, in a depth of about 8 fathoms (14^m6); this anchorage may be approached from northward or southward of Koelefoe 30 (Lat. 0° 20' N., Long. 127° 53' E.).

As Kolo eilanden only show up against the coast in the afternoons, the only landmark for making the roadstead in the morning is the 2,117-foot (645^m3) peak, situated about 8 miles westward of Jef, which is very conspicuous from eastward. There is a chain of five hills, 35 ranging from 684 to 1,255 feet (208^m5 to 382^m5), in the foreground westward of Weda, but they can only be distinguished about the same time as Kolo eilanden. Lenggioea, the highest peak on the western side of the peninsula, about 10 miles westward of Tanjong Silota, can be seen over these hills. 40

To pass northward of Karang Pasir Tidore a vessel should steer for the conspicuous steep slope of the 2,117-foot (645^m3) peak, mentioned above, until Tanjong Foja bears 191°, thence she should alter course south-westward and steer for the southernmost and highest of the five hills westward of Weda, bearing 244°, until the warehouse on the beach 45 northward of Weda village is open south-westward of Koelefoe, bearing about 313°, when she should steer for the anchorage, passing south-westward of the 3-foot (0^m9) patch south-eastward of Koelefoe.

To pass southward of Karang Pasir Tidore, a vessel should steer for the steep slope of the 2,117-foot (645^m3) peak, bearing 287°, and when 50 abeam of that reef steer for the anchorage.

Chart 2787, plan of Weda road.

A vessel intending to enter Telok Maidi from eastward should keep the northern extremity of Koelefoe in line with the warehouse north-

Chart 2787, plan of Weda road.

ward of Weda village, bearing 279° until the western extremity of the islet Maidi is in line with the rock lying on the coastal reef, bearing 342° , when she should alter course northward and keep these marks in line, which leads close eastward of the beacon marking the outer edge of the tongue of reef extending from the western side of the entrance; care should be taken not to open the rock westward of the islet.

A vessel approaching from southward should keep the same leading marks in line bearing 342° , which leads about one cable westward of the beacon marking the 3-foot (0^m9) patch south-eastward of Koelefoe.

Weda.—Weda village is the headquarters of a district chief. A flag-staff stands in front of the Government official's residence.

Charts 2788, 942b.

ISLANDS SOUTH-EASTWARD OF HALMAHERA.—Gébé.

15 —For the general aspect of Gébé, *see* page 82. The south-western coast is covered with mangroves; Tanjong Oeboelié (Ubulie), about 10 miles south-eastward of Tanjong Sofa, is rocky and steep, and Tanjong Toeli (Tuli) Kalio, about 7 miles farther south-eastward, rises within to a steep hill, 848 feet (258^m5) high, with some casuarina trees on its summit. Between these two points is Fau, an islet with a conical hill, 418 feet (127^m4) high, of a reddish colour, at its southern end. See view facing page 80.

At the southern extremity of Gébé is Boki Nanasi, 622 feet (189^m6) high, and covered with grass.

25 The only inhabited places on the north-eastern coast are the villages Sanafi and Katjepi (Kachepi) adjoining one another, about 7 miles from the south-eastern extremity; they are mostly hidden in coconut plantations. There are openings in the reef which fringes the island, on both sides of the villages, through which a landing can be effected when the surf is not too heavy. A small rocky islet lies close north-westward of Sanafi.

Anchorage.—Anchorage may be obtained by vessels with local knowledge in the channel northward of Fau, where there is good shelter although there may be a tidal stream here. There is a small detached reef, which dries, with a small sandy patch on its eastern extremity, which can be plainly seen, lying on the southern side of the fairway in the entrance; the Gébé coast should be followed at a distance of from $1\frac{1}{4}$ to $1\frac{1}{2}$ cables. The entrance southward of Fau can only be used when the reefs in it can be plainly seen. The lagoon, entered on the northern side of Fau, is only accessible for small vessels with local knowledge.

Anchorage may be obtained by vessels with local knowledge, in a depth of 16 fathoms (29^m3), in the bight between the southern end of Fau and Tanjong Toeli Kalio (*Lat.* $0^\circ 09' S.$, *Long.* $129^\circ 28' E.$).

45 There is anchorage for vessels with local knowledge, in a depth of about 33 fathoms (60^m4), in Ingalan, a bight at the southern extremity of Gébé, and also in the bight close eastward of it, off Oemera (Umera) village.

Vessels with local knowledge may obtain anchorage off Sanafi village, in a depth of about 22 fathoms (40^m2), about half a cable offshore; the coast here is steep-to.

Chart 942b.

Joe.—Oeta.—Joe (Yu) and Oeta (Uta) are low islands covered with

Charts 2759a, 1263.

Chart 942b.

moderately high vegetation and coconut plantations, lying within 10 miles north-eastward of Gébé. They lie about $1\frac{1}{2}$ miles apart, with a channel which is deep and free from dangers in the fairway, between, but it is narrowed to about one mile in width by a reef, usually marked 5 by discoloration, with a depth of $4\frac{1}{2}$ fathoms (7^m8) at its outer edge, which extends about $1\frac{1}{2}$ miles south-eastward from Oeta. There is a deep and clear channel between Gébé and Joe.

On the south-western side of Joe, which is partly rocky, is Omnia village, close north-westward of which anchorage may be obtained by 10 vessels with local knowledge; the bottom is too steep for anchoring immediately off the village, and the tidal stream may be strong. The lagoon, on the southern side of the island, is accessible for boats.

Oeta is uninhabited.

Chart 3745.

Gag.—Dangers.—This island, about 22 miles south-eastward of Gébé, is 1,143 feet (348^m4) high on its south-western side. The western coast is rocky and steep, but the northern and eastern coasts must be given a good berth. The northern part of the island is the most densely covered with vegetation. The island is uninhabitable on account of the 20 myriads of stinging gnats.

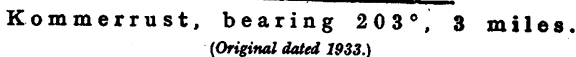
A $6\frac{1}{2}$ -fathom (11^m9) patch lies about three-quarters of a mile off the northern side of the island, and a $5\frac{1}{2}$ -fathom (10^m1) patch lies about 2 miles south-eastward of the north-eastern point. Madjet (Majet) is a rock above water, on which there are some conspicuous trees, lying 25 on the fringing reef, which dries, about 2 miles southward of the same point. Visschers bank, with depths of from one to $6\frac{1}{2}$ fathoms (1^m8 to 11^m9), lie within $1\frac{1}{2}$ miles of the south-eastern extremity of the island.

Jef Doif.—Dangers.—Jef (Yef) Doif, or Pulau Bamboe, consisting of Klaarbeek (Klarbek), Schoteroog, Vlaming and Kommerrust, all 30 uninhabited islands, lies about 17 miles southward of Gag. Klaarbeek is 365 feet (111^m2) high and rocky, with steep sides. A shoal, with a least depth of $2\frac{3}{4}$ fathoms (5^m0), lies close southward of the island, and a $4\frac{1}{2}$ -fathom (8^m7) patch lies about $6\frac{1}{2}$ miles north-north-westward.



Schoteroog (Lat. $0^\circ 51' S.$, Long. $129^\circ 46' E.$) and Vlaming, about 35 4 and 7 miles, respectively, south-south-westward of Klaarbeek, are low coral islets covered with vegetation, and bordered by a sandy beach; there is a conspicuous knob-shaped tree on Vlaming. A 6-fathom (11^m0) patch lies about 2 miles westward of Vlaming.

Kommerrust is a low coral islet, covered with vegetation, with 40 a conspicuous square tree on it, lying about $7\frac{1}{2}$ miles eastward of



Schoteroog. Two shoals, with depths of 7 and $4\frac{1}{2}$ fathoms (12^m8 and 7^m8), lie about $3\frac{1}{2}$ and $5\frac{1}{2}$ miles, respectively, eastward of Schoteroog.

For Jef Fam group, see page 199, and Kofiau, see page 104.

Charts 942b, 2759a, 1263.

CHAPTER III

CERAM SEA

Charts 942a, b.

CERAM SEA.—Ceram (Serang) sea is the wide channel extending from the eastern side of Celebes on the west, as far as the meridian of Misool on the east. It is bounded on the north by the islands of Soela and Obi and the chain of islands extending eastward to Kofiau, and on the south by the islands of Boeroe and Ceram.

Chart 3241.

SOELA EILANDEN.—This group consists of the mountainous, but sparsely cultivated islands, Taliaboe, Mangoli and Sanana, which lie together with a number of islets, eastward of Celebes.

The climate is favourable; there are no unhealthy districts except the coastal marshes.

Taliaboe.—The western end of Taliaboe is occupied by a high tableland, exceeding an elevation of 4,000 feet (1219^m2) in parts, from which spurs descend steeply to the sea; there are no noticeable peaks in this part, and the summits shown on the chart are merely the highest parts of almost equally high land. This end of Taliaboe is described in Eastern Archipelago Pilot, Vol. II. At the eastern end, spurs from the high land slope down to the coast.

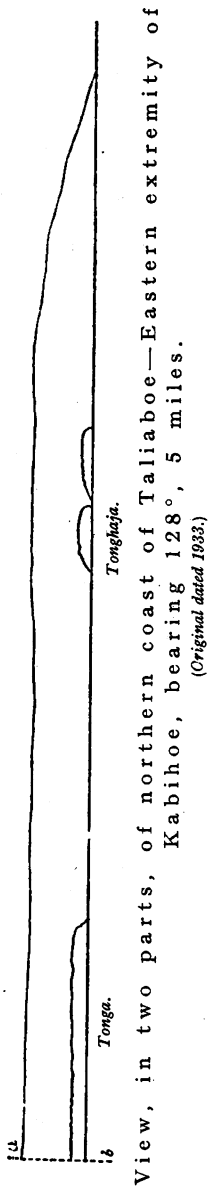
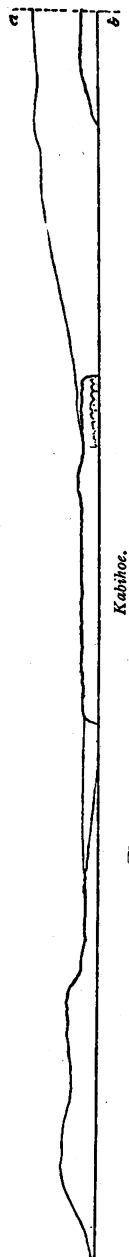
Northern side of Taliaboe.—Coast.—Vessels passing the northern side of Taliaboe are recommended to keep in depths of over 100 fathoms (182^m9). During the northerly monsoon there may be a considerable sea near the coast. The tidal streams possibly set eastward and westward along the coast, but no observations have been made.

The coast eastward of Tanjong Lae (*Lat. 1° 41' S., Long. 124° 52' E.*), situated in the middle of the northern side of the island, has an entirely different aspect to that westward of it. The land is moderately high close to the coast, the coast is more indented, and thus affords more landmarks in addition to the off-lying islets.

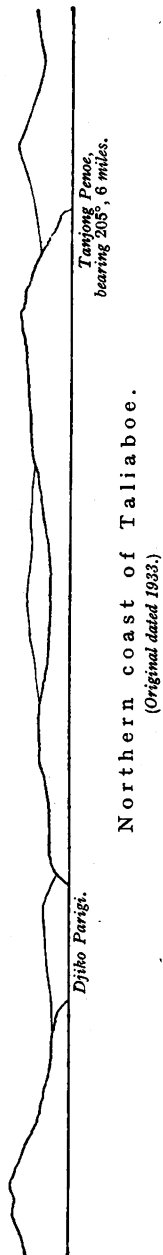
Off-lying islets and dangers.—About 1½ miles northward of Tanjong Lae is the Tonghaja group, consisting of two coral islets, covered with vegetation, with a sandy beach, and fringed by a coral reef. About 3½ and 6 miles, respectively, eastward of this group are Tonga and Kabihoë, similar but larger islets. Gono and Lake are similar islets lying close together on the coastal reef about 6 miles eastward of Tanjong Lae. Pasi Toeri (Turi) is a sandbank with some shrubs on it about 1½ miles eastward of Lake. See view facing page 91.

Charts 942a, 2759a, 1263.

To face page 91.



View, in two parts, of northern coast of Taliaboe—Eastern extremity of Kabihoë, bearing 128° , 5 miles.
(Original dated 1933.)



Tanjong Penoe,
bearing 205° , 6 miles.

Northern coast of Taliaboe.
(Original dated 1933.)

Chart 3241.

A 7-fathom (12^m8) patch and a 23-foot (7^m0) patch lie about 4 miles north-north-eastward and 2½ miles north-eastward, respectively, of the eastern islet of Tonghaja group and a reef, which dries, lies about a quarter of a mile southward of the western islet. A shoal, with a least depth of 3 fathoms (5^m5), lies about 1½ miles northward of Kabihoë. There is foul ground between Tonga and Kabihoë on the north and the coast of Taliaboe on the south. A shoal, with a depth of 33 feet (10^m1), and another with a depth of 7 feet (2^m1), lie about 3 miles east-south-eastward and 3½ miles south-eastward, respectively, of the eastern extremity of Kabihoë.

Directions.—A vessel with local knowledge can proceed without difficulty through the passage southward of Tonga and Kabihoë during the South-east monsoon, when the reefs are plainly visible, which is frequently the case during this period. A vessel approaching from westward should steer close along the coastal reef extending from the northern side of Gono, and after having passed the 6-foot (1^m8) patch, about half a mile eastward of it, she should steer for Pasi Toeri with the eastern extremity of Tonga astern, until Gono bears 270°, when she should alter course eastward and thence gradually haul northward out of the foul area. Care should be taken to avoid the 26-foot (7^m9) patch about one mile northward of Tanjong Penoe, situated 14½ miles eastward of Tanjong Laoe, and the 5-foot (1^m5) patch off the entrance to Djikoe Doehoe (Jiko Duhu), about 1½ miles eastward of Tanjong Pohonbatoe, situated about 1½ miles north-eastward of Tanjong Penoe (Lat. 1° 41' S., Long. 125° 06' E.). See view facing this page.

Anchorage.—Anchorage may be obtained anywhere off this coast in the northerly monsoon, except off Penoe village, situated close to Tanjong Penoe, Djikoe Doehoe, and Djikoe Tanamoe.

Southern side of Taliaboe.—Coast.—Tanjong Kona, about 37 miles eastward of Tanjong Merah, the south-western point of the island, is rocky and conspicuous, as is also Tanjong Kasika, about 6 miles east-north-eastward. A reef, which dries, extends from the latter point, as it does from all the more projecting points. The coastal hills near Tanjong Kasika are fairly conspicuous, as are those near the steep Tanjong Hokoe, about 5 miles east-north-eastward.

There may be a tidal stream along this coast. Whirlpools have been observed off the prominent headlands.

Except eastward of Tanjong Hokoe anchorage may be obtained anywhere off this coast in favourable weather conditions. Vessels with local knowledge may obtain anchorage off Sofan village, about midway between Tanjong Pastoeri and Tanjong Kona, fairly close offshore, in a depth of 9 fathoms (16^m5); also in a small bight off Kawada village, close westward of Tanjong Kona, in a depth of 3½ fathoms (6^m9). Off Mantarara village, standing at the head of the bay between Tanjong Kona and Tanjong Kasika, there is a dark sandy beach bordered by a coconut plantation. Wajkadai village, about midway between Tanjong Kasika and Tanjong Hokoe, is bordered by a sandy beach, with coconut trees.

Chart 3440, plan of Tjapaloeloe strait and Vesuvius bay.

Tanjong Ndoloedeoe, the south-eastern point of Taliaboe, is sandy, rising to hilly land close within it; there is a conspicuous rocky patch on the coast close northward of it.

Straat Tjapaloeloe.—Dangers.—This strait, separating the

Chart 3440, plan of Tjapaloeloe strait and Vesuvius bay.

eastern end of Taliaboe from Mangoli, is deep in the fairway and is easily navigated by the largest vessels. Tanjong Ndoloeselagi, the western entrance point of the southern end of the strait, is low, thickly covered by vegetation, and is rendered conspicuous by a large rock on the drying reef which fringes the point. Tanjong Sakomata, the eastern entrance point of the southern end of the strait, is low, but is densely wooded with tall trees. Between this point and Tanjong Batoe Gossok, a conspicuous point about one mile north-westward, there is a bight with a sandy beach. Farther northward the forest on both sides of the strait extends to the shores.



Straat Tjapaloeloe from northward.

(Original dated 1933.)

Baai van Dofa, entered on the eastern side of the northern entrance of the strait, is fringed with mangroves. Dofa village stands on Tanjong Dofa, the northern entrance point of the bay. A spit, with a least depth of 13 feet (4^m0), extends from the southern side of the inner part of the bay, otherwise it is clear in the fairway.

A 19-foot (5^m8) patch lies about a quarter of a mile north-westward of Tanjong Batoe Gossok, and a 7-foot (2^m1) patch lies close off the western shore about 6 cables northward of Tanjong Ndoloeselagi. A rock, with a depth of 5 feet (1^m5), lies on the eastern side of the fairway, about 6 cables southward of Tanjong Gina, situated about 2½ miles northward of Tanjong Batoe Gossok.

Tidal streams.—The maximum rate of the north-going tidal stream in Straat Tjapaloeloe at springs is about 9½ knots, and of the north-going and south-going streams at neaps is about 3 knots. The duration of slack water is short, the greater the rate of the stream before and after the turn, the shorter is the period of slack water.

The strong stream is due to the differences in the tidal movement at the southern and northern entrances of the strait. At times, when the water is rising at Dofa, it is falling rapidly in Vesuvius baai, on the south-western side of Mangoli.

The turn of the stream off Tanjong Batoe Gossok (*Lat.* 1° 52' S., *Long.* 125° 20' E.) occurs, on an average, 40 minutes later than the moment at which the levels at the northern and southern ends of the strait are the same.

In the southern and middle parts of the strait there are heavy whirlpools, eddies and tide-rips, which may seriously affect the steering of a vessel. These are not experienced at the northern end.

Anchorage.—**Directions.**—Anchorage may be obtained in the bight with a sandy beach south-eastward of Tanjong Batoe Gossok, in a depth of 3½ fathoms (6^m9), out of the strong tidal stream; also off the entrance to Baai van Dofa, in a depth of 22 fathoms (40^m2), where the vessel will be clear of the tidal stream.

A vessel approaching the southern entrance should steer for Tanjong Batoe Gossok when the strait is open, and pass Tanjong Ndoloeselagi at a distance of about 2½ cables; thence steer to pass the same distance off Tanjong Batoe Gossok, thence at first keep parallel to the Taliaboe

Chart 3440, plan of Tjapaloeloe strait and Vesuvius bay.

shore but then gradually close that shore, until, when abeam of Tanjong Gina, she will be about $1\frac{1}{2}$ cables from the Taliaboe shore; thence she can steer northward out of the strait, keeping in the eastern half of it.

5

A vessel approaching the strait from northward will identify Tanjong Fatoekomboe, the western entrance point, which is red and rocky; when the strait is open she should follow the directions given above in the reverse order.

Vesuvius baai.—This bay is situated in the western part of the bight entered between Tanjong Sakomata and Tanjong Batoe Kapitan (chart 3241), about 6 miles east-south-eastward. The latter point is high and rocky, and is very conspicuous from a distance eastward and westward; a conspicuous pillar-shaped rock lies close off the point on the narrow drying coastal reef.

15

Vesuvius baai is fronted by Pasi Ipah, an islet which can be identified by its hilly western peak, on which a dense clump of trees projects above the remaining vegetation. Pasi Ipah village, on the northern side of the island, stands on a sandy beach in the middle of a coconut plantation; elsewhere its coasts are muddy and covered with mangroves. A channel in the drying reef, which fringes the island, gives access to a landing pier near a conspicuous mosque and flagstaff. This channel, which is marked by stakes, has depths of from 6 to 9 feet (1^m8 to 2^m7), and at the head of the pier there is a depth of 5 feet (1^m5).

20

About $1\frac{1}{2}$ miles eastward of Pasi Ipah is Kena, an islet, which shows plainly against the monotonous background, due to its bright sandy beach. The reef which fringes the island, extends as much as 6 cables from its south-western side.

25

At Lipo village and Oenabensia village, about three-quarters of a mile northward, situated on the western side of the bay, there are sandy beaches in the mangrove which borders this side of the bay, behind which are extensive coconut plantations reaching to the slopes inland. There is a small pier on the reef, which dries, at Lipo, which can be reached at high water. The head of the bay is muddy and fringed with mangroves.

35

Anchorage.—Anchorage may be obtained on both sides of Pasi Ipah and Kena (*Lat.* $1^{\circ} 53' S.$, *Long.* $125^{\circ} 25' E.$), in depths of about 20 fathoms (36^m6) and 16 fathoms (29^m3), respectively. With southerly winds there is more shelter in Vesuvius baai.

Chart 3241.

40

Mangoli.—Both the western and eastern parts of Mangoli are mountainous; the mountains in the western part, contrary to those in Taliaboe, afford conspicuous landmarks. The most conspicuous peaks are those of the Auponhia gebergte, about 7 miles east-north-eastward of Tanjong Batoe Kapitan, which are 2,038 and 2,143 feet (621^m2 and 653^m2) high, and the 3,446-foot (1050^m3) peak of Boeaja gebergte (Buya mountains), about 12 miles east-north-eastward of the same point; the depression between these two ranges is very noticeable. The peaks of Lokoe gebergte, which attain an elevation of 3,761 feet (1146^m4), situated about 18 miles from the eastern extremity of the island, are not easy to identify. See view facing page 96.

50

Northern side of Mangoli.—Coast.—The only dangers off this coast in depths of over 10 fathoms (18^m3) are in the vicinity of the Taboeloe eilanden (page 94) and between these islands and Koro,

Chart 3241.

about 8 miles farther eastward. Thence to the eastern end of the island vessels can pass relatively close to the coast, the only known danger being a 2-foot (0^m6) patch, lying about half a mile offshore, about 4 miles eastward of Tanjong Lampaoe. See below.

The tidal streams possibly set eastward and westward along the coast. During the survey, at the height of the South-east monsoon, a calmer sea was experienced off the north coast, than was found off the south coast during the North-west monsoon. During the latter there was a troublesome sea for small vessels off the north coast.

From Tanjong Wajteja (Wayteya), the eastern entrance point of the northern end of Straat Tjapaloeloe, to the vicinity of the Taboeloe eilanden, about 8½ miles eastward, the coast is low. It is marshy in the vicinity of Baai van Dofa, and Tanjong Wajteja is rocky; eastward of this point there is a sandy beach, except in the bays and inlets. Likoe, about 3 miles east-north-eastward of Tanjong Wajteja, is a low wooded islet. The eastern of the Taboeloe eilanden is hilly on its southern side. The passage between these islands and the coast of Mangoli is encumbered with dangers.

From the Taboeloe eilanden vessels can safely navigate along the coast eastward, passing southward of the one-foot (0^m3) patch lying 2 miles eastward of the islands, and of a ridge, at the north-western end of which there is a patch which dries, and at the south-eastern end a patch, with a depth of about 2 feet (0^m6), situated about 6 miles eastward of the same islands, and thence southward of Koro; a low islet, covered with vegetation. The coast here has a different aspect from that westward, as it is more rocky and the prominent headlands are steeper. See view facing page 96.

Mentjeri (Mencheri), close offshore and about 4½ miles east-south-eastward of Taboeloe eilanden, is a low islet, thickly covered with vegetation. Close offshore, about 2 miles westward and three-quarters of a mile eastward of Tanjong Lampaoe, a low point, about 10 miles eastward of Mentjeri, are the low islets Poei and Dodokoe, respectively, thickly covered with vegetation.

Anchorages.—Anchorage may be obtained by vessels of shallow draught with local knowledge, at the head of the bay, which is bordered with mangroves, entered between Likoe and Tanjong Fatoepira (*Lat. 1° 46' S., Long. 125° 28' E.*), about 2½ miles eastward, in a depth of 3½ fathoms (6^m9), south-eastward of two low islets, covered with vegetation. Likoe village, on the western side near the entrance, was the only village, in 1930, on the almost uninhabited northern coast of Mangoli.

Good anchorage over a mud bottom, may be obtained in the bight eastward of Tanjong Falabisahaja, situated about 1½ miles eastward of Tanjong Fatoepira.

Between Taboeloe eilanden and Tanjong Lampaoe, anchorage may be obtained anywhere off the coast during the South-east monsoon and the transition periods.

Coast.—Between Tanjong Lampaoe and Tanjong Pandara, the eastern extremity of Mangoli, spurs from the mountains slope down to the coast, where it is in many places high and rocky. The only danger off this coast is a rock, with a depth of 2 feet (0^m6), situated about 4 miles eastward of Tanjong Lampaoe. Pulau Tabobi, about 9 miles westward of Tanjong Pandara, is a large rock, which, although lying

Chart 3241.

on the coastal reef, is clear of the rocky point, with reddish-brown vertical cliffs from 130 to 165 feet (39^m6 to 50^m3) high. About 3½ miles farther eastward is Pulau Fatsati, another remarkable rock lying on the coastal reef which dries. Close off Tanjong Pandara there is an islet with high, sharply defined sides, on which there is a clump of casuarina trees, lying on the coastal reef.

Anchorage may be obtained anywhere off this stretch of coast, but it is necessary to anchor close offshore in places. There are a few temporary settlements along this coast.

Southern side of Mangoli.—Coast.—Between Tanjong Batoe Kapitan (page 93) and Tanjong Fargata, a high and rocky point, 5½ miles eastward, the coast is very steep, but thence to Tanjong Kedafota, 16½ miles farther eastward, it is less so and is bordered by an almost unbroken sandy beach. Pulau Sambiki is a high, steep and conspicuous islet lying about half a mile southward of Tanjong Kedafota, which latter also appears as an islet from westward. There is a clear channel, 2½ cables wide, between them, but a ridge of reefs, on which there are two patches which dry, extends from the islet to Kaporu village, which latter is conspicuous on account of its coconut plantation, about 3½ miles westward.

The shores of the bight entered between Tanjong Kedafota and Tanjong Botoe, a low sandy point, 8 miles eastward, are steep, rocky and covered with vegetation in its western part to a position northward of Nofanini, an islet lying close offshore about one mile north-eastward of Tanjong Kedafota, thence to Tanjong Botoe it is sandy. Between Tjapaloeloe (Chapalulu) village, about 4½ miles eastward of Nofanini, and Tanjong Botoe, about 3 miles south-eastward, there are coconut plantations. Oelfola (Ulfola) village, about midway between Tjapaloeloe and Tanjong Botoe, with a small pier, is easy to identify.

Off-lying dangers.—Two reefs, one with a depth of 11 feet (3^m4), and the other with 2 feet (0^m6), lie about 2 miles north-eastward and 2½ miles east-south-eastward, respectively, of Pulau Sambiki (*Lat. 1° 56' S., Long. 125° 47' E.*).

Tidal streams.—Tidal streams set along the southern side of Mangoli. Whirlpools have been observed off the headlands.

Anchorage.—Anchorage may be obtained between Tanjong Batoe Kapitan and Pulau Sambiki during the northerly monsoon, anywhere except off the steep rocky points, but it is inadvisable during the southerly monsoon. Vessels with local knowledge can safely proceed through the channel between Pulau Sambiki and Tanjong Kedafota, and obtain good anchorage in two small bights close westward of the point. Anchorage may be obtained anywhere between Pulau Sambiki and Straat Mangoli.

Straat Mangoli.—Danger.—This strait, between the southern side of Mangoli, in the vicinity of Tanjong Botoe, and the northern end of Sanana, an island 2 miles southward, is deep in the fairway, except for a 23-foot (7^m0) patch lying about three-quarters of a mile southward of Tanjong Botoe. About 2½ cables off the northern shore about 1½ miles north-eastward of Tanjong Botoe, there is a shoal, with a least known depth of 3 fathoms (5^m5), but as it has not been thoroughly examined, there may be less depths.

The northern coast of Sanana is muddy, bordered with mangroves, and fringed by a reef, which dries, extending as much as 8 cables offshore.

Charts 942a, 2759a, 1263.

Chart 3241.

Tidal streams.—The tidal streams in Straat Mangoli may attain a rate of from 3 to 4 knots, and there may be whirlpools in the vicinity of, and especially southward of, the 23-foot patch southward of Tanjong Botoe. The tidal stream sometimes sets on to the reef extending from the north-eastern side of Sanana.

Directions.—A vessel proceeding through Straat Mangoli from westward should keep Pulau Sambiki astern, bearing 270° , which leads northward of the 2-foot (0^m6) patch east-south-eastward of that islet, which is not marked by discoloration, and pass about $2\frac{1}{2}$ cables southward of Tanjong Botoe; thence continue eastward with Pulau Sambiki astern, which will lead clear of the reef extending from the north-eastern side of Sanana; when Tanjong Wakapara, the north-eastern extremity of Sanana, is in line with Tanjong Kabau, about 2 miles southward, bearing 180° , course may be altered as required.

Coast.—Off-lying danger.—The coast between Tanjong Botoe and Tanjong Kausigi, about 14 miles east-north-eastward, is low and sandy. There are coconut trees and several villages, most of which have a small pier, between Tanjong Botoe and Tanjong Gohadjodjara, 19 miles east-north-eastward. The latter point is the westernmost of a succession of rocky points extending to the eastern end of the island. Anchorage may be obtained anywhere off this stretch of coast.

A rock, with a depth of 2 feet (0^m6), lies about 2 miles south-south-westward of Tanjong Gohadjodjara.

Straat Lifoematola.—Dangers.—This strait, between the eastern end of Mangoli and Lifoematola, the easternmost of the Soela eilanden, is encumbered with islets and dangers, and should not be used by vessels without local knowledge. The tidal streams in the strait are strong, there are whirlpools and eddies over the banks and shoals, and during the southerly monsoon there is a troublesome sea. There is only a short period of slack water.

Pagama (*Lat. $1^{\circ} 50' S.$, Long. $126^{\circ} 20' E.$*), an islet lying on a reef, which dries, in the southern entrance of the strait, is low, but is covered with high coconut trees; about three-quarters of a mile north-north-eastward of it is Nini, an islet lying in the middle of the strait near its narrowest part. A shallow bank extends $3\frac{1}{2}$ cables south-westward from Nini.

Lifoematola.—This island, which is uninhabited, is 844 feet (257^m2) high, and rises moderately steeply. Limo, a conspicuous rocky islet, lies close off the south-eastern side of the island, about one mile south-westward of Tanjong Dehekolano, its eastern extremity, and abreast it is a remarkable limestone cliff. Tanjong Dehekolano can be identified by its white limestone rocks. See view facing this page.

Strong tidal streams, setting northward and southward round the eastern end of the island, cause heavy whirlpools for a distance of one mile offshore, and when the wind and stream are opposed there is a heavy sea in depths of less than 110 fathoms (201^m2). A strong tidal stream also sets along the northern and southern sides of the island.

Anchorage may be obtained by vessels with local knowledge, in a depth of 44 fathoms (80^m5), during the North-west monsoon and transition periods, in Djiko Kahiamasolo, the southernmost of three narrow inlets northward of Tanjong Dehekolano, about $1\frac{1}{2}$ cables from the coastal reef extending from the northern side of the inlet. Only

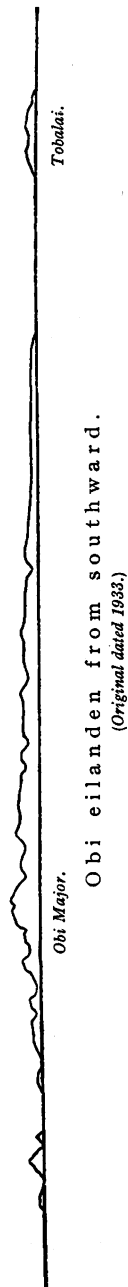
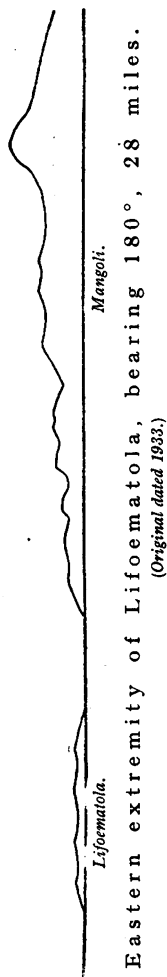
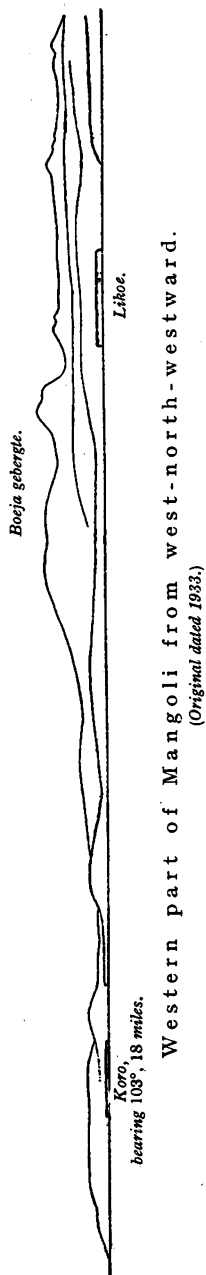


Chart 3241.

the outer part of Djiko Loleopapoea, close northward of Djiko Kahiamasolo, is accessible.

Sanana.—This mountainous island has several conspicuous peaks on a ridge extending northward and southward, and which slopes steeply to the eastern and western coasts, forming sharply defined and almost vertical clefts. The summit, about 5 miles from the southern extremity, is 2,222 feet (677^m3) high, and about 3½ miles from the northern extremity there are two peaks, 1,746 and 1,281 feet (532^m2 and 390^m5) high, with a conspicuous tree on the latter.

The coast is mostly low, with sandy beaches and coconut plantations interspersed in places with rocky points, but can be approached closely except along the northern half of the western side, and in Straat Mangoli.

The tidal streams around the island are moderately strong.

Western side of Sanana.—Dangers.—There are coconut plantations along the whole of the west coast. A drying reef extends about half a mile from the north-western side of the island, and at Molboefa village, about 3½ miles south-south-westward of Tanjong Koema (Kuma), the northern extremity of the island, there is an opening in this reef which is accessible for small vessels with local knowledge, but there is a shoal, with a depth of 2 feet (0^m6), barely marked by discoloration, off the entrance. There is a small pier at the village.

Temporary anchorage may be obtained by vessels with local knowledge south-westward of the entrance to this opening, about 2½ cables outside the drying reef, in a depth of about 6 fathoms (11^m0), with the flagstaff in Molboefa village bearing about 111°, and the point abreast Fokalik village, 3 miles south-south-westward, 194°. Two shoals, with depths of 17 and 23 feet (5^m2 and 7^m0), lie about half a mile offshore southward of this anchorage, and south-westward of a conspicuous rocky cliff fringed by a wide beach, situated about 6½ cables south-westward of the landing pier at Molboefa. A vessel proceeding northward from this anchorage should keep well outside the coastal reef when the east-going stream is setting into Straat Mangoli.

A 2-foot (0^m6) patch lies about half a mile offshore abreast Fokalik village. Tanjong Fatparoma (*Lat. 2° 06' S., Long. 125° 51' E.*), about 1½ miles southward of Fokalik, is rocky, but Tanjong Patahoj, 7½ miles farther southward, is low and marshy. A chain of reefs, with depths of from 6 to 26 feet (1^m8 to 7^m9), extends 5½ miles north-north-westward from the latter point.

At Kabau village, about 1½ miles northward of Tanjong Patahoj, there is a shallow lagoon, with a bridge across its narrow entrance. Anchorage may be obtained within half a mile northward of it, taking care to avoid the reefs mentioned above.

Between Tanjong Patahoj and Tanjong Waka, the low southern extremity of the island, the depths are too great for anchorage. Whirlpools may be experienced off Tanjong Waka.



South-eastern point of Sanana, bearing 359°,
16 miles.

Eastern side of Sanana.—Coast.—Between Tanjong Sakita,

Charts 942a, 2759a, 1263.

Chart 3241.

about $1\frac{1}{2}$ miles eastward of Tanjong Koema (page 97), and Poheu village, about $2\frac{1}{2}$ miles south-eastward of Tanjong Sakita, the coast is muddy and fringed with mangroves, and a drying reef extends as much
 5 as one mile offshore. At Poheu there is a conspicuous mosque standing on posts. In the coastal reef there are two openings accessible to small craft with local knowledge, one entered about $1\frac{1}{2}$ miles eastward of Tanjong Sakita, and the other abreast Poheu village. The tidal streams in this vicinity are strong, and vessels are recommended to give
 10 it a wide berth.

Chart 930, plan of Sanana bay.

Baai van Sanana.—Beacons.—This bay, entered between Tanjong Kabau (page 97) and Tanjong Bega, about 6 cables south-south-westward, is the principal anchorage off the island, and is the
 15 headquarters of a Government official.

The entrance is marked by two beacons standing on the edge of the foul ground which extends from the reefs, which dry, on either side; that on the northern side is surmounted by a white ball, and that on the southern side by a black truncated cone.

20 At the head of the harbour is Sanana village, in which there is a conspicuous mosque and a small pier with a depth of 2 feet (0^m6) at its head. Northward of the village are two wireless masts on either side of an old fort and a small mole, and southward of it there is a conspicuous shed.

25 There are two leading marks at the head of the bay; the front mark, consisting of a white post on a shed, stands on the head of the pier; the rear mark is a white triangular board, point down, on the Controleur's house.

The limit of the roadstead is the arc of an imaginary circle with
 30 a radius of 2,789 feet (850^m0) and the pier-head as centre.

A vessel should enter with plenty of way, on account of the tidal stream setting across the entrance, keeping the leading marks in line, bearing 282° . The starboard anchor should be let go, in a depth of about 8 fathoms (14^m6), when the vessel is about $1\frac{1}{2}$ cables from the pier
 35 and after swinging, a hawser should be laid out to a post northward of the pier.

Chart 3241

Coast.—Anchorages.—There are a number of villages standing in the midst of coconut plantations on the east coast of Sanana. If there
 40 is insufficient room in Baai van Sanana, anchorage may be obtained by vessels with local knowledge, in a small bight about one mile southward of Tanjong Bega (*Lat.* $2^\circ 18' S.$, *Long.* $126^\circ 01' E.$), in a depth of 33 fathoms (60^m4), about $1\frac{1}{2}$ cables from the coastal reef, or about 6 miles farther southward, in depths of from 16 to 22 fathoms (29^m3 to
 45 40^m2), but these anchorages are unsuitable during the strength of the southerly monsoon.

Chart 942a.

OBI EILANDEN.—These islands, which lie on the northern side of the Ceram sea, about 55 miles east-north-eastward of Soela eilanden,
 50 comprise Obi Major, 5,283 feet (1610^m3) high, and seven smaller islands. The passages between these islands are deep in the fairway and clear of dangers, except that between Gomoemoe (Gomumu) and the southern side of Obi Major and between Bisa and the northern side of Obi Major.

Charts 2759a, 1263.

Chart 942a.

Anchorage may be obtained in most places, although usually in considerable depths, but from June to September the eastern and southern coasts are difficult to approach owing to the high sea, and from December to February, inclusive, this applies to the western side. Vessels then usually proceed to the anchorage off Laiwoei village, off the northern side of Obi Major, between this island and Bisa.

Chart 2788.

Tapat and Bisa.—Tapat, the north-westernmost island of the group, and Bisa, about $2\frac{1}{4}$ miles eastward of it, are both wooded nearly to the water's edge, being only broken by coconut plantations near the villages. The two highest peaks of Tapat, which have elevations of 1,845 and 1,612 feet (562^m3 and 491^m4), are conspicuous. On Bisa there is a mountain ridge, 1,530 feet (466^m3) high at its north-western extremity.

Pulau Djeroem (Jerum), on the wide drying reef which extends from the north-eastern extremity of Bisa, is a small group of muddy patches covered with mangroves, in the middle of which there is a conspicuous tree. Pulau Santaré, on the drying reef which extends about three-quarters of a mile from the south-eastern extremity of Bisa, although low, is visible from a considerable distance owing to the tall growth on it.

Off-lying danger.—Koerier, a reef with a depth of 6 feet (1^m8), and steep-to, lies $7\frac{1}{4}$ miles east-north-eastward of Pulau Djeroem; it consists of sand and coral, and is well marked by discoloration.

Bèlang Bèlang and Obi Latoe.—Bèlang Bèlang, $5\frac{1}{2}$ miles southward of Tapat, is a low island; its northern coast is sandy and steep-to; its southern coast and the coasts of Telor, an islet lying close off its south-western side, are muddy and covered with mangroves. There is a flagstaff on the north-eastern extremity of Bèlang Bèlang, and a pier, with a least depth of 19 feet (5^m8) alongside.

A ridge, with a depth of $3\frac{1}{4}$ fathoms (5^m9) at its outer end, extends about one mile south-south-westward from the western extremity of Bèlang Bèlang, and a reef, with a depth of 7 feet (2^m1), lies nearly 2 miles west-south-westward of the same point (*Lat. $1^{\circ} 19' S.$, Long. $127^{\circ} 22' E.$*).

Charts 2788, 3241.

Obi Latoe, $2\frac{1}{2}$ miles southward of Bèlang Bèlang, has several conspicuous peaks, the highest of which, near the eastern end, has an elevation of 2,754 feet (839^m5), and appears as a sharp cone from the westward. On the northern coast there are strong squalls from off the steep mountains, especially in the inlets, but farther out it is calmer.

A reef, with a depth of 8 feet (2^m4), marked by discoloration, lies about 2 miles south-westward of the north-western extremity of Obi Latoe, and about one mile offshore. A small reef, marked by discoloration, lies close southward of Toesa (Tusa), an islet situated off the north-eastern side of Obi Latoe.

Anchorage may be obtained in the inlets on the northern side of Obi Latoe; the rocky peninsulas between them and Toesa are bare and reddish in colour.

Chart 3241.

Western coast of Obi Major.—**Dangers.**—Between Tanjong Leleo Basso, the north-western extremity of Obi Major and a position abreast Mala Mala, an island, 785 feet (239^m3) high, lying about half

Charts 2759a, 1263.

Chart 3241.

a mile offshore, about 5 miles southward, the coast is high. There is a deep passage between Mala Mala and Obi Major.

Pasi Toeri (Pasi Turi) is an islet fringed by a drying reef lying about 5 $1\frac{1}{4}$ miles westward of the south-western extremity of Mala Mala. A reef, with a depth of 4 feet (1^m2), lies $2\frac{1}{4}$ miles southward of the same point; it is only slightly marked by discoloration. A detached drying reef lies close off the western side of Obi Major, about one mile northward of Lodji (Loji), a conspicuous village situated about 5 miles northward of Tanjong Ake Iamo, the south-western point of Obi Major. 10 A reef, with a depth of 4 feet (1^m2), lies close north-westward of Lodji; it is only slightly marked by discoloration.

At Kawassi village and at Tanjong Kawassi, situated about one mile and 3 miles, respectively, southward of Lodji, there are conspicuous 15 coconut plantations and tall casuarina trees.

Anchorage may be obtained during the southerly monsoon northward of Tanjong Ake Iamo, which is covered with mangroves.

Chart 2788.

Northern coast of Obi Major.—The coast for about 4 miles eastward of Tanjong Leleo Basso is hilly, reddish in colour, and sparsely 20 covered with vegetation. Kerka and Kadera, islets from about 100 to 130 feet (30^m5 to 39^m6) high, and densely covered with vegetation, lie about 2 miles south-eastward, and 5 miles east-north-eastward, respectively, of Tanjong Leleo Basso, and are conspicuous from a considerable 25 distance. A detached reef in Djiko (Jiko) Dollong, entered about $3\frac{1}{4}$ miles south-eastward of the same point, is marked by discoloration, as is also the coastal reef extending from the eastern side of this inlet. There is a $1\frac{1}{2}$ -fathom (2^m7) patch about half a mile northward of Kerka.

From eastward of Kadera to Tanjong Anggai, about 13 miles east- 30 north-eastward, the coast is low and covered with forest and coconut plantations alternately. This part is mostly inhabited, but the villages are difficult to identify.

Within 10 miles of this stretch of coast there are a number of peaks, of which one, 4,319 feet (1316^m4) high, situated about $5\frac{1}{4}$ miles south- 35 westward of Tanjong Anggai (*Lat.* $1^\circ 21' S.$, *Long.* $127^\circ 45' E.$), is the easiest to identify. They are frequently already obscured by clouds one hour before sunrise, and often during the night. The peak 2,797 feet (852^m3) high, situated $6\frac{1}{4}$ miles south-westward of Tanjong Anggai, is conical, but does not show plainly against the land behind. 40 The south-westernmost peak, 4,230 feet (1289^m3) high, about $10\frac{1}{2}$ miles south-eastward of Tanjong Leleo Basso, appears conical from northward, but from westward as a rounded crest.

Charts 2786, plan of Laiwui and adjacent channel, 2788.

Reede Laiwoei and approaches.—**Dangers.**—Reede Laiwoei 45 (Laiwui) is situated in the channel between the northern side of Obi Major and Bisa, off Laiwoei village, about $12\frac{1}{2}$ miles north-eastward of Tanjong Leleo Basso. There is a pier at the village, with a depth of about 2 feet (0^m6) alongside.

The approaches to the roadstead are encumbered with reefs, some of 50 which are only slightly marked by discoloration. Laiwoei rif, which dries, and on which there are two small bushes, lies about 3 miles south-westward of the pier at Laiwoei village. Sambiki is a small sandy islet covered with coconut trees, lying close off the northern coast of Obi Major, about $4\frac{1}{4}$ miles eastward of the pier.

Charts 942a, 2759a, 1263.

Charts 2786, plan of Laiwui and adjacent channel, 2788.

There is no tidal stream in the roadstead.

A vessel approaching from eastward should keep Tanjong Bobane Hoeda (Bobane Huda), at the south-western end of Bisa, in line with the south-eastern extremity of the same island, bearing 276° , and pass the latter point at a distance of about $3\frac{1}{2}$ cables or less, thence she should steer westward until the conspicuous zinc roofs and large sheds in Laiwoei village bear about 190° ; thence alter course southward and keep the head of the pier in line with the 3,325-foot (1013^m4) peak, situated about $5\frac{1}{2}$ miles south-south-eastward, bearing 165° , anchoring in a depth of about 11 fathoms (20^m1) when the northern extremity of Sambiki is in line with the first point eastward of Laiwoei village, bearing 091° , at a distance of about 2 cables from the edge of the coastal reef eastward of the pier; or with Pulau Kadera, bearing about 240° , open its own width north-westward of Tanjong Taboedji (Tabuji), at a distance of about $1\frac{1}{2}$ cables from the same reef.

In approaching from westward, a vessel should keep in depths of over 100 fathoms (182^m9) until Laiwoei pier bears 127° , when she should alter course southward and approach the anchorage as directed above.

Chart 2788.

Coast.—Off-lying dangers.—Between Laiwoei and Tanjong Anggai the coast is bordered by coconut plantations, thence to Tanjong Woka, about 9 miles south-eastward, the mountains approach close to the coast, chalk rocks appearing in places, and an occasional coconut plantation.

Two reefs which dry, on which lie the two Gèta eilandjes, which are sparsely covered with shrubs, and sand patches with casuarina trees, lie from about $2\frac{1}{2}$ to 3 miles offshore between Tanjong Anggai (*Lat. $1^{\circ} 21' S.$, Long. $127^{\circ} 45' E.$*) and Tanjong Woka, and a shoal, with depths of from $1\frac{1}{2}$ to 6 fathoms (3^m2 to 11^m0), lies within $1\frac{1}{2}$ miles north-westward of the north-western Gèta eilandje. Between these islets and the coast there is foul ground within $1\frac{1}{2}$ miles of Obi Major.

Woka, an island close north-westward of Tanjong Woka, shows well against the land behind on account of its light colour. The bight south-eastward of the island affords a calm anchorage for vessels with local knowledge at all times. There are coconut plantations and dwellings on the northern and southern sides of Woka.

Chart 3241.

Between a position about one mile northward of Tanjong Salam Boeroeng (Salam Burung), a rocky point situated about 3 miles south-eastward of Tanjong Woka, and Tanjong Parigi, about 12 miles farther south-eastward, there is a barrier reef, within which there are a number of islets and reefs lying from one to 2 miles offshore; these islets and the coast within them are covered with mangroves. Only at Kelo, an islet close offshore, $1\frac{1}{2}$ miles south-eastward of Tanjong Salam Boeroeng, at the villages Sesèpè and Tawa, about 3 and 6 miles, respectively, farther south-eastward, and on the eastern extremity of Marosa, an island on the barrier reef about $1\frac{1}{2}$ miles north-north-westward of Tanjong Parigi, are there sandy beaches with coconut trees. The villages are difficult to identify.

Good anchorage may be obtained by vessels with local knowledge anywhere off this stretch of coast inside the barrier reef, in moderate depths, also off Sesèpè and Tawa and within Kelo, but here only the south-eastern entrance is available.

Charts 942a, 2759a, 1263.

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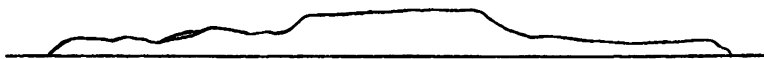
Chart 3241.

There is access to the area within the barrier reef north-eastward of Tanjong Salam Boeroeng, also eastward of Kelo, north-eastward of Sesèpè, and north-westward of Marosa; the reef extending from
 5 Marosa is well marked by discoloration. The passage south-eastward of Marosa should not be attempted owing to the coral growth. Mud creeks extend some considerable distance inland westward of Tanjong Parigi. From this point to Tanjong Djoboeboe (Jobubu), about
 5 miles south-eastward, the coast is bordered with high trees, and there
 10 is very little beach.

Charts 3241, 3242.

Straat Tobalai.—This strait, which separates the island of Tobalai from the eastern extremity of Obi Major, is deep and clear of dangers. The coast of Obi Major is, like the low land within it, uniformly covered
 15 with vegetation, and in places is fringed by a narrow reef.

Tobalai has a flat tableland, 785 feet (239^m3) high, which slopes gradually on its south-western side; it is uninhabited. The dense



Tobalai, bearing 214°, 24 miles.

(Original dated 1933.)

forest reaches to the coast, which is rocky in many places. A useful object when approaching the strait is the steep slope on the eastern side
 20 of the summit, 2,681 feet (817^m2) high, which lies at the eastern end of a ridge of about the same height, which extends westward through the middle of Obi Major, about 11 miles westward of Tanjong Djoboeboe.
Chart 3241.

Southern coast of Obi Major.—This coast is steep to and the land
 25 within rises steeply; on it are a number of villages which can be distinguished by their coconut plantations; elsewhere the land to the top of the mountains is covered with forest. A peak, 3,164 feet (964^m4) high, about 20 miles westward of Tanjong Djoboeboe (*Lat.* 1° 37' S.,
Long. 128° 10' E.), and a cleft in the coast southward of it are con-
 30 spicuous. The peaks in the middle of the island can also be identified, but they are frequently obscured by clouds. See view facing page 96.

The best anchorage off this coast in the favourable season of the year, is off Wai Lower village, near the southern extremity of the island, as there is little or no tidal stream here.

35 **Off-lying island and dangers.**—Pasir Radja or Sophia reef, with a least depth of 26 feet (7^m9), and seldom clearly marked by discoloration, lies about 5 miles south-westward of Wai Lower village.

Gomoemoe (Gomumu), an island 914 feet (278^m6) high, lies about
 5½ miles southward of Wai Lower village. Except for Pasir Radja,
 40 there is a clear channel between the island and Obi Major. The island is fringed by a drying reef for the greater part. Pasir Poetih (Pasir Putih) village is situated on the north-eastern side of the island, and on the coastal reef here, which is marked by discoloration, is Paniki, an islet, close north-eastward of which there is a reef, with a depth of 3 feet
 45 (0^m9) over it. About half a mile northward of Paniki there is a drying rock, marked by discoloration. The deep passage between Paniki and the reef should only be attempted when the reefs are plainly visible owing to the strong tidal stream.

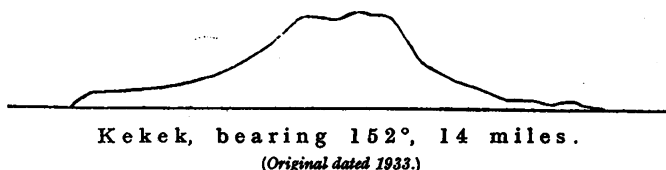
Charts 942a, b, 2759a, 1263.

Chart 3241.

Haga ma doto, an islet lying on the drying coastal reef on the south-eastern side of Gomoemoe, is difficult to identify from a distance.

Charts 3242, 2788.

ISLANDS AND DANGERS BETWEEN OBI EILANDEN AND NEW GUINEA.—Lawin eilanden and Kekek.—Kekek or Silaijang, 690 feet (210^m3) high, densely wooded, and the shape of a truncated cone, lies 17 miles north-eastward of Tobalai.



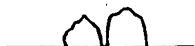
Toppershoedje or Tema, 139 feet (42^m4) high, and rocky, covered with shrubs, lies about 2 miles north-eastward of Kekek. 10

Watinger (*Lat. 1° 31' S., Long. 128° 42' E.*), 280 feet (85^m3) high at its north-eastern extremity, and wooded, lies 3½ miles eastward of Kekek. Lawin or Tapiola, about half a mile eastward of Watinger, is entirely occupied by a round hill, 772 feet (235^m3) high, with a notched appearance. A shoal, with a depth of about 8 fathoms (14^m6), not marked by 15 discoloration, lies nearly one mile northward of Lawin.

Laliola, about three-quarters of a mile south-eastward of Lawin, is a flat island with high trees. A shoal, with a depth of 23 feet (7^m0), extends about 7 cables south-eastward from Laliola.

The whole group is uninhabited. 20

Pisang.—Pisang, an island about 12½ miles north-eastward of Lawin, is very steep and has two peaks, the higher of which has an elevation of 1,520 feet (463^m3). The depths in its vicinity are very irregular. The island is uninhabited, and is almost impenetrable owing to its steepness and dense growth. Good anchorage may be obtained 25 by vessels with local knowledge close off the northern and south-eastern sides of the island.



(Originals dated 1933.)

Batu Anjoer are two rocks above water, about one cable apart, with a depth of 3 fathoms (5^m5) between them, lying about 3 cables off the north-western side of Pisang. Another rock, above water, also named 30

Charts 942a, b, 2759a, 1263.

Charts 3242, 2788.

Batu Anjoer (Anyur), lies 4 cables off the south-eastern side of Pisang. A moderately strong stream may set between Pisang and this rock.

Chart 2788.

- 5 **Takat Sapa.**—This reef, with a least depth of 29 feet (8^m8) and marked by discoloration, lies about 16 miles north-north-eastward of Pisang.

- Boo eilanden.**—Boo (Bo) eilanden, about 25 miles north-eastward of Pisang, consist of three islands and several islets. The two western
10 islands, named Boo Besar, are about 328 feet (100^m0) high and flat, and are separated from one another by a narrow passage filled with a reef. On the northern side of the islands there are rocky parts interspersed with sandy beaches and forest; the southern coast is mostly covered with mangroves. The shoals extending about three-
15 quarters of a mile off the western extremity are usually marked by discoloration.

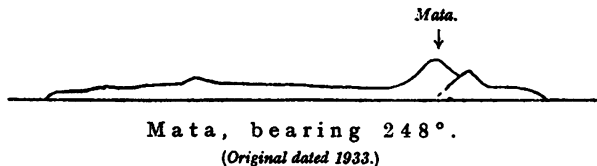
- Boo Kechil or Popa,** the eastern island, and the islets between it and Boo Besar, are low; these islets are mostly of atoll formation, and the coral edge is thickly covered with vegetation. The lagoons are shallow
20 and are only accessible to praus.

- A ridge of reefs, consisting of sand and coral, and marked by discoloration, lies along almost the entire southern edge of the bank on which this group lies, at a distance of about one mile. Between this ridge and the southern edge of the group there is a channel, which,
25 except off the southern side of Boo Kechil, is clear of dangers. There are several passages through the ridge of reefs, that southward of Jef (Yef) Beto (*Lat. 1° 12' S., Long. 129° 24' E.*), an islet lying about half a mile south-eastward of the south-eastern extremity of Boo Besar, being the best. The water is usually very clear during the transition
30 periods of the monsoons, when the bottom can be seen up to depths of about 9 fathoms (16^m5). There are several channels between the islets, available for vessels with local knowledge.

Vessels should not approach the southern side of the group within 3 miles.

- 35 **Dona Carmalita bank,** about 6 miles southward of Boo Kechil, has a least depth of 19 feet (5^m8); the atoll edge is marked by discoloration, and the presence of fish. A deceptive appearance of rocks above water is sometimes produced by large schools of porpoises lying on the surface. The tidal streams which set northward and southward at a rate of
40 about 2 knots, when opposed to the wind, cause breakers on the bank. A maximum rate of 2½ knots has been observed amongst the islands. *Chart 3744.*

Kofiau.—Anchorages.—This island, about 15 miles eastward of Boo Kechil, has two conspicuous hills on its northern side; Mata or



- 45 **Boemfoar,** the western hill, is 943 feet (287^m4) high, and the other 655 feet (199^m6). Both hills are dome-shaped when seen from north-

Charts 3242, 942b, 2759a, 1263.

Chart 3744.

ward or southward, but are conical from eastward. Elsewhere, except for some hills in the western part, the island is low. See view facing page 106.

Kofiau is thickly covered with vegetation, as are also the islets lying along its northern coast and those off its south-western side. Except in the inner bays on the southern side, the water is so clear that the bottom can be seen in a depth of about 10 fathoms (18^m3).

The western and southern sides of the islands off the south-western coast of Kofiau, and also the northern, eastern, and southern coasts of Kofiau itself as far westward as Tanjong Ai Tapor can be safely approached to a distance of half a mile.

During November and December strong tidal streams, attaining a maximum rate of 2½ knots, set along the coast of Kofiau and between the islands.

Charts 3744, 3745.

Good anchorage may be obtained by vessels with local knowledge, in depths of from 8 to 14 fathoms (14^m6 to 25^m6), during the northerly monsoon, in the channel between Kofiau and Ef Torobi, an island lying close westward. There is a 33-foot (10^m1) patch in the northern entrance of the channel, which can be avoided by keeping on the Ef Torobi side near the middle. Djailolo (Jailolo), an islet, lies on the eastern side of the entrance, and close eastward of it are three other islets; Mangi Mangi, the westernmost, is connected to Djailolo by a reef. A vessel can approach the anchorage by passing between these islets and the coast of Kofiau, in a least depth of 10 fathoms (18^m3).

An excellent anchorage may be obtained by vessels with local knowledge, in depths of from 6 to 10 fathoms (11^m0 to 18^m3), in the channel between the northern side of Kofiau and Deer (Der), an islet situated northward of Mata ((*Lat.* 1° 10' S., *Long.* 129° 50' E.). The channel is about 1½ cables wide at the anchorage southward of Deer village, situated on the southern side of the islet of that name. The western entrance to the channel is narrowed by the coastal reef. A vessel lies here quietly in all conditions of weather.

Chart 3744.

Wambong or Suriname baai, on the southern side of Kofiau at its eastern end, is narrow, but affords good shelter from all winds, except south-westerly, which seldom occur. The anchorage is, however, narrow. The western shore is covered with mangroves, and the eastern shore is fringed by a narrow coral reef with mangroves inside it, with a sandy beach at the inner end.

Good anchorages may be obtained by vessels with local knowledge amongst the islets off the south-western side of Kofiau.

The few Papuan inhabitants live in scattered settlements on the western islets, on Djailolo and Deer. Fish abound in the vicinity.

MISOOL.—This island is situated with Tanjong Jamtoe (Yamtu), its northern extremity, about 38 miles south-westward of Tanjong Sele, the western extremity of New Guinea; it is low in its northern part, and high in the southern part. The islets lying off the northern side of the island are low, and those off the eastern and south-eastern sides are high.

Charts 3242, 942b, 2759a, 1263.

Chart 3744.

Northern side of Misool.—Dangers.—There are numerous islets and dangers off the northern coast of Misool, for which the chart must be consulted. The outer danger off the western end is Fitzmaurice shoal or Masmas Oelit, with a depth of 3 fathoms (5^m5), seldom marked by discoloration, lying 13 miles northward of Tanjong Fet Dom, the western extremity. The conspicuous peaks on the south-western coast are only visible from northward when off Waigama, and from farther eastward when farther offshore. *See* view facing this page.

- 10 **Waigama.—Dangers.**—Waigama village, on the northern coast of Misool, about 7 miles east-north-eastward of Tanjong Fet Dom, is the only village of any importance in the island; it is the headquarters of a Government official and of the Rajah of Noord Misool.

A 23-foot (7^m0) patch lies about 8 cables north-north-westward of 15 Waigama and a 2½-fathom patch about 9 cables north-north-eastward. Pial, an islet, lies on the coastal reef about 6 cables west-north-westward of Waigama, and Katapoe lies on the southern edge of a detached reef about 1½ miles east-north-eastward of Waigama.

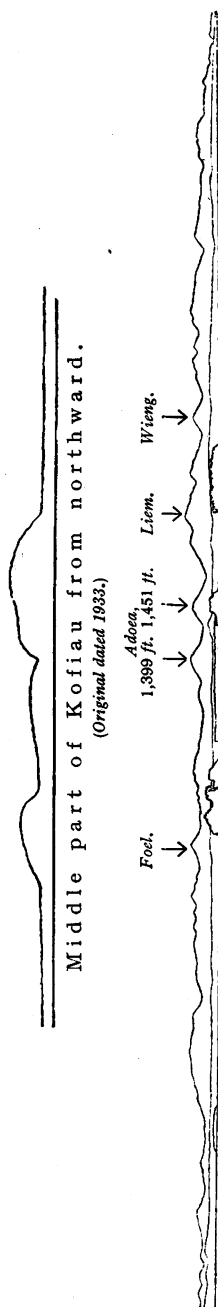
- Anchorage.—Directions.**—The best anchorage is in a depth of 20 about 10 fathoms (18^m3), with the northern extremity of Pial in line with the northern extremity of Kaptjan Kechil, an islet lying close offshore about 3½ miles west-south-westward, bearing 252°, and Wagajel, a small peninsula close eastward of the village, 180°.

- A vessel approaching from westward should pass between Tanjong 25 Fet Dom (*Lat.* 1° 53' S., *Long.* 129° 43' E.) and Kanari, an island about 4½ miles north-westward, and thence about 2½ cables northward of Pial; or she may pass more than one mile northward of Pial and approach the anchorage with the western extremities of Pian and Moeslat, islets situated about 5 and 7 miles, respectively, northward of 30 Waigama, bearing 002°, astern, which will lead between the 2½ fathoms and 23-foot (4^m6 and 7^m3) patches mentioned above.

- A vessel approaching from eastward should pass between Tanjong Jamtoe and Kalies eilanden, thence steer to pass one mile northward of the small detached reef situated about 2 miles north-north-eastward of 35 Tanjong Haokep, about 13½ miles westward of Tanjong Jamtoe; this reef can be identified by its being abreast a low white sand hill. When this reef bears 180° the vessel should steer to pass southward of Laitot and Haowat, islets lying about 3 miles west-north-westward of Tanjong Haokep, thence pass between Bellis Darat and Moet Mafela, about 40 3½ miles farther westward, thence keep the north-western extremity of Moet Mafela in line astern with the south-eastern extremity of Haitlal, bearing 068°, until the rocky point westward of Sungei Bano, about 1½ miles eastward of Wagajel peninsula, is in line with Liem, 1,592 feet (485^m2) high, on the south-western side of the island, bearing about 45 195°, but the point is not easy to identify.

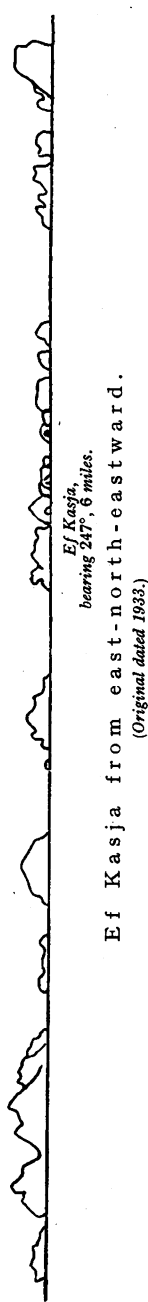
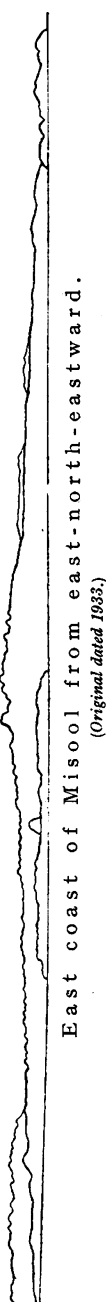
- Thence she should steer for Liem, which is conspicuous, bearing 192°, until the northern extremity of Pial is in line with the northern extremity of Kaptjan Kechil, bearing 252°, when she should steer on this line, which leads between the reef extending from the northern side 50 of Katapoe and the 2½-fathom (4^m6) patch north-westward of it, and thence to the anchorage.

Tidal streams.—Off Waigama, the tidal stream sets westward with the rising tide, at a maximum rate of 2 knots in the open, and 3 knots in the narrow passages.



Western part of Misool from northward.
(Original dated 1933.)

Bejampop,
bearing 247°, 5 miles.



Ef Kasja,
bearing 247°, 6 miles.

Chart 3744.

Eastern side of Misool.—Between Tanjong Jamtoe and Tanjong Openta, about 12 miles south-south-eastward, where the coast is low and flat, the most conspicuous marks are Zadelberg (Saddle peak), 1,071 feet (326^m4) high, and Koepelberg (Cupola peak), 964 feet (293^m8) high. Southward of Tanjong Openta, the coast rises vertically from the sea. Baai van Tamoelol, southward of Tanjong Openta, is inaccessible, as it is encumbered with numerous reefs, which are steep-to. The only inhabited place is Tamoelol village at the head of the bay. Bajampop, 798 feet (243^m6) high, in the shape of a sugarloaf, 10 situated on the southern side of Mesemta, about 9 miles southward of Tanjong Openta, is conspicuous. See view facing page 106.

Off-lying islands and dangers.—Amongst the islands which extend east-south-eastward from Mesemta there are many deep channels, but they are not recommended on account of the strong and 15 irregular currents, and the very slight discoloration of the reefs; there is a safe passage, however, between Ef Pian, a group of islets about 17 miles east-south-eastward of Mesemta, and the Sagof group, about 2 miles westward.

Ef Kasja or Seven islands, about 4 miles north-north-eastward of 20 Ef Pian, are steep-to, the highest having an elevation of 172 feet (52^m4). See view facing page 106.

Valsche Pisangs are the easternmost of the chain of islands and scattered rocks lying off the south-eastern end of Misool. The principal island of this uninhabited group is Daram (*Lat.* 2° 09' S., *Long.* 25 130° 55' E.), 431 feet (131^m4) high, and covered with forest. An islet, 286 feet (87^m2) high, which is connected to the southern side of the eastern extremity of Daram by a drying reef, is also wooded, and when seen from southward is conspicuous on account of some steep yellow rocks. A detached rock, in the shape of a beehive, lies on the coastal 30 reef off the eastern extremity of Daram. The passage immediately northward of Daram is clear of dangers.

The remaining islets of the group consist of high masses of rock; the north-westernmost are some black rocks, 14 feet (4^m3) high, lying 6½ miles north-westward of the western extremity of Daram. 35 rocks lying about three-quarters of a mile east-south-eastward of the black rocks, are only just above water.

Anchorage may be obtained during the South-east monsoon, off the northern side of Daram.

A 10-foot (3^m0) patch lies about 3½ miles south-eastward of the black 40 rocks. A shoal, with a depth of 11 feet (3^m4), and another with a depth of 10 feet (3^m0), lie about 2½ miles westward and 1½ miles south-eastward, respectively, of the western extremity of Daram.

Southern side of Misool.—Between Tanjong Motlol, situated about 1½ miles south-eastward of Tanjong Fet Dom, and the islands off 45 the south-eastern coast, there are several peaks which are good landmarks and the coast is clear of dangers for a distance of 20 miles east-south-eastward of Tanjong Motlol. To a vessel approaching the western end of Misool from westward, only Liem (page 106), which appears as a cone, will be seen. Approaching nearer, Elban and 50 Jadata (Yadata), about 14 miles farther eastward, will be identified.

The passage between Pulau Tiga, about 19 miles east-south-eastward of Tanjong Motlol, and the southern side of Misool is safe, but the coastal reef is not well marked by discoloration.

Chart 3744.

Anchorage may be obtained by small vessels with local knowledge between Joe (Yu), an islet 2 miles eastward of Pulau Tiga and the coast of Misool. The ridge with a drying rock on it, which extends from the eastern extremity of Joe, is nearly always marked by surf. The natives state that during the South-east monsoon this part of the coast is almost inaccessible. Between Jef Bie (Yef Bi), an islet about $5\frac{1}{2}$ miles east-south-eastward of Joe, and the coast of Misool the coastal reef is not marked by discoloration, except in the channels, one on either side of Kaheri, which, contrary to the channel on the western side of Jef Bie, are easy to navigate.

Baai van Lilinta and approaches.—Dangers.—This bay, entered between Tanjong Wafani, about 6 miles eastward of Jef Bie, and Tanjong Kapat Malesket, the conspicuous headland forming the western extremity of Langkissiel, an island 6 miles farther eastward, is encumbered with dangers. It is sheltered during the North-west monsoon but is difficult to approach during the South-east monsoon, on account of the high seas. Lilinta, the principal village, lies close north-eastward of Tanjong Wafani.

The bay can be approached from westward without difficulty, but the reefs are not well marked by discoloration, except that around Fagom genan, situated 3 miles south-south-westward of Tanjong Wafani (Lat. $2^{\circ} 03' S.$, Long. $130^{\circ} 16' E.$).

On approaching the anchorage off Lilinta, Ketjitot, an islet about 2 miles eastward of Tanjong Wafani, in line with Tapalol, bearing 052° , leads south-eastward of the reef, which is only slightly marked by discoloration, extending from Tanjong Wafani, and the 3-fathom (5^m5) patch off it, which is not discoloured. The anchorage is calm during the North-west monsoon.

Approaching from southward the best channel is eastward of Jef Pelee (Yef Pele), an island about $7\frac{1}{2}$ miles southward of Tanjong Wafani, thence eastward of Kaoenoet (Kaunut) Sollon, a rock, 202 feet (61^m6) high, about $2\frac{1}{2}$ miles north-eastward of the eastern extremity of Jef Pelee, thence between Batoe and Maté, about $2\frac{1}{2}$ miles farther north-eastward. There is, however, a 23-foot (7^m0) patch, slightly marked by discoloration, on the western side of this passage, and a rock close off the western extremity of Maté. A vessel should pass about 2 cables westward of this rock, which will lead through in a least depth of 6 fathoms (11^m0), and thence steer for the entrance to Baai van Lilinta, avoiding a shoal, with a depth of 26 feet (7^m9), about 3 miles south-eastward of Tanjong Wafani.

The easiest approach from eastward is northward of Boo (Bo), an island, 464 feet (141^m4) high, which rises vertically from the sea, situated 17 miles eastward of Jef Pelee, thence northward of the chain of islands of which Boo is the easternmost. Batbitiem, southward of this chain, has a conspicuous summit, 565 feet (172^m2) high, which appears very sharp from north-north-eastward. Thence the route given above for the southern approach should be followed.

On the northern side of this approach are:—Djal eilanden (Jal islands), 126 feet (38^m4) high, about 7 miles northward of Boo, and a conspicuous rock about one mile west-north-westward of them; Djam eilanden (Jam islands), about $2\frac{1}{2}$ miles west-south-westward of Djal eilanden, are low; the drying reef about one mile north-westward of them is marked by discoloration, and has two rocks on it which just

Chart 3744.

dry at high water. Balbiléget, some rocks 182 feet (55^m5) high, about 3½ miles north-westward of Djam eilanden, are conspicuous.

The passage between Wajaban, an island about 8 miles north-westward of Boo, and Olobie palé, a conspicuous conical islet about one mile south-eastward of it, may be used, but there is a 16-foot (4^m9) patch, well marked by discoloration, in the middle.

There is another approach from eastward farther northward between Jaganan (Yaganan) and Gag, islets lying about 3 miles eastward of Tanjong Kapat Malesket. The reefs extending from these islets, except that from the south-western end of Jaganan, are well marked by discoloration. The reefs extending from Jilloe, an islet about half a mile south-south-westward of Gag, and from Tanjong Dabatan, the western extremity of Ketimkerio, about 1½ miles south-south-westward of Jilloe, are also well marked by discoloration.

The channels between Jaganan and Japale (Yapale), north-westward of it, between Japale and the coast of Misool, and between Gag and Ginjamato (Ginyamato), south-eastward of it, should not be used, on account of their bends and the strong tidal streams in them.

Lilinta village (*Lat. 2° 03' S., Long. 130° 16' E.*), only a few houses of which are visible from seaward, is the headquarters of the Rajah of Zuid Misool. The zinc roof of a storehouse is conspicuous. Fafanlap village stands on the northern shore of Baai van Lilinta, about 5½ miles north-eastward of Lilinta village.

Tidal streams.—The tidal streams off the southern coast of Misool set eastward and westward at a maximum rate of 2 knots, which is generally less than that off the northern coast. In the narrow channels, however, the streams are sometimes stronger and very irregular.

Chart 3241.

BOEROE.—Boeroe (Buru) lies on the southern side of Ceram sea, with Tanjong Palpetoe, its north-western extremity, 38 miles southward of Sanana (page 97). It is very mountainous, but the peaks are difficult to identify at a distance, the higher ones being frequently obscured by clouds. At the eastern end of the island is Vlake van Namlea, an extensive plain, which extends to the eastern coast. The island is fringed by a reef in many places, but there are depths of over 100 fathoms (182^m9) close to the coast nearly everywhere.

Climate.—The climate is reported to be unhealthy.

NORTHERN SIDE OF BOEROE.—Coast.—Between Tanjong Palpetoe, which is a conspicuous sloping point, and Tanjong Bebek, about 12½ miles eastward, the mountains approach close to the coast at Bara baai. This mountain ridge has some remarkable peaks, the highest of which, and of the whole island, is Kapalatmada, with a fairly sharp peak, 7,967 feet (2428^m3) high, about 10 miles south-south-westward of Tanjong Bebek. Tomahoe, about 9½ miles farther westward, has a double peak, the eastern of which is 7,088 feet (2160^m4) high, and appears as a sharp horn with the point inclined westward. At the western end of the ridge, about one mile from the western coast, is a sharp cone, covered with vegetation, 2,397 feet (730^m6) high. From Tomahoe, a desolate high ridge, with three conspicuous peaks on it, slopes down to Tanjong Palpetoe, and from a position about 5 miles

Charts 942a, 2759a, 1263.

Chart 3241.

eastward of Kapalatmada, a spur with two triple peaks extends northward towards Tanjong Bebek.

There are a number of villages on the northern coast of Boeroe, the positions of which may best be seen on the chart. Anchorage may be obtained anywhere during the southerly monsoon. Bara baai is entered between Tanjong Palpetoe and Tanjong Bara, about $8\frac{1}{2}$ miles eastward. There is a narrow plain at the head of the bay. Bara village is situated close southward of Tanjong Bara.

10 The tidal streams set eastward and westward along the northern coast of Boeroe at a maximum rate of about $2\frac{1}{2}$ knots. The west-going stream is inclined to set into Bara baai.

Between Tanjong Bebek and Tanjong Wamlana, 13 miles eastward, the coast consists of an unbroken sandy beach, behind which the plain rises to hilly land covered with reeds, and thence farther inland to a continuation of the mountain ridge described above. On the eastern part of this ridge, about 9 miles southward of Tanjong Ili, about midway between Tanjong Bebek and Tanjong Wamlana, there is a peak, 4,781 feet (1457^m3) high, which appears as a square block from north-eastward and northward; from farther westward it appears as the summit of a ridge.

Between Tanjong Wamlana and Tanjong Wapoti, 10 miles eastward, and about $1\frac{1}{2}$ miles farther eastward to Tanjong Batoe Noehan (Batu Nuhan), the coast consists of an unbroken sandy beach. The only river is the Wai Nibé, which is about 100 feet (30^m5) wide at its mouth, flowing into the sea at Tanjong Wambé, about midway between Tanjong Wamlana and Tanjong Wapoti (*Lat.* $3^{\circ} 04' S.$, *Long.* $126^{\circ} 41' E.$). The peak, 2,987 feet (910^m4) high, on the eastern side of the Wai Nibé, about 4 miles inland, can be identified by its very dark colour.

The aspect of the coast between Tanjong Wapoti and Tanjong Hatawanoe, about $5\frac{1}{2}$ miles eastward, is in striking contrast to that on either side of it, for it is high, steep, and rocky, and the mountains come closer to the coast. The highest part, with an elevation of 2,035 feet (620^m3), is the extremity of a ridge of nearly equal height running north and south, southward of Tanjong Batoe Noehan. Eastward of this ridge, which has a very steep eastern side, and separated from it by a deep cleft, is a high plateau.

Between Tanjong Hatawanoe and the entrance to Wa Eplaoe baai, about 7 miles south-eastward, the coast consists of an unbroken sandy beach, behind which there is a plain which rises gradually within to light green hills, covered with reeds, which connect with the mountains in the interior.

There is a conspicuous hill, 637 feet (194^m2) high, with a tree on it, about 4 miles north-westward of Tanjong Karbau (page 111), and Terwissie, 1,165 feet (355^m1) high and devoid of trees, lies about $2\frac{1}{2}$ miles farther north-westward. All the other hills in this vicinity are sparsely covered with trees.

Although good anchorage may be obtained, out of the influence of the tidal streams, by vessels with local knowledge, in Wa Eplaoe baai and Djikoe (Jiku) Merasa, about 8 miles south-eastward, they are both unsafe during the South-east monsoon.

Chart 911, plan of Kayeli bay.

Baai van Kajeli.—Baai van Kajeli (Kayeli), on the north-eastern

Charts 942a, 2759a, 1263.

Chart 911, plan of Kayeli bay.

side of Boeroe, is entered between Tanjong Karbau, $8\frac{1}{2}$ miles south-eastward of Djikoe Merasa, and Tanjong Waät, a low point, about $4\frac{1}{2}$ miles farther south-eastward; these points rise to hilly land and are easy to identify, as the land round the head of the bay is low and muddy. 5

Good anchorage may be obtained by small craft with local knowledge in a bight in the coastal reef on the southern side of the bay, in depths of from 19 to 22 fathoms (34^m7 to 40^m2), mud and sand. The drying reef which extends about three-quarters of a mile westward from 10 Tanjong Pasir Poetih (Pasir Putih), situated about 2 miles south-westward of Tanjong Waät, should be given a good berth when it is covered, as it is not marked by discoloration. The islets Besar and Ketjil lie on this reef. There is a deep channel in the reef eastward of Ketjil, accessible to small craft with local knowledge. 15

Wai Apoe flows into the western side of the bay at Tanjong Wa Apoe. In 1928, it was ascended by a motor boat for a period of 5 hours, in a least depth of 10 feet (3^m0); the width of the river varied from about 90 to 110 yards (82^m3 to 100^m6), and the rate of the stream was estimated to be from 3 to 4 knots. 20

Rainfall.—See page 25.

Chart 911, plan of Namlea road.

Reede Namlea.—Light.—Beacons.—Reede Namlea lies on the northern side of Baai van Kajeli, its limits being the meridian of $127^{\circ} 05' 10''$ E. and the parallels of $3^{\circ} 16' 20''$ S. and $3^{\circ} 16' 30''$ S. The 25 roadstead is always free from swell.

A light (*Lat. $3^{\circ} 17' S.$, Long. $127^{\circ} 06' E.$*) is exhibited from the head of the pier, where there is a depth of $6\frac{1}{2}$ feet (2^m0).

An unofficial beacon surmounted by a cylinder stands at the eastern end of a shoal situated about $8\frac{1}{2}$ cables west-south-westward of the pier. 30 The roadstead is much encumbered with shoals, some of which are marked by unofficial beacons; their positions can best be seen on the plan.

Namlea village is the headquarters of a Government official.

Anchorage.—Directions.—Anchorage may be obtained, in a depth 35 of about 11 fathoms (20^m1), about half a mile west-south-westward of the pier-head, also on the northern side of a $2\frac{1}{2}$ -fathom (4^m6) patch marked by a beacon, about $4\frac{1}{2}$ cables westward of the light structure, and on the south-eastern side of a $1\frac{1}{2}$ -fathom (3^m2) patch, marked by a beacon, about 4 cables south-westward of the light structure. 40

A vessel approaching Reede Namlea should not pass too close to the northern entrance point of Baai van Kajeli on account of two one-fathom (1^m8) patches which lie close southward of it. There is a conspicuous clump of high trees on the slope of the hill close westward of these patches, and on a clear night is visible sufficiently for a vessel to 45 enter until the light on the pier at Namlea is sighted.

Chart 3241.

WESTERN SIDE OF BOEROE.—Coast.—Between Tanjong Waeken, situated about 4 miles south-westward of Tanjong Palpetoe (page 109), and Tanjong Wafia, about $2\frac{1}{2}$ miles farther south-westward, 50 there are three conspicuous hills, lying close inland, the northernmost of which is 840 feet (256^m0) high and half bare, and the middle one entirely bare. Tanjong Wafia is low and covered with coconut trees. About

Charts 942a, 2759a, 1263.

Chart 3241.

2½ miles farther southward the coast is very high and the mountains approach close to the sea. Tomahoe (page 109) is very conspicuous, and appears as a cone from westward.

- 5 Tomahoe eilanden, consisting of Tomahoe, about 1½ miles southward of Tanjong Wafia, and Tengah, about 4 cables farther southward, lie close offshore. About 2 miles southward of Tengah is Fogi, a hilly island, which is a good landmark. Southward of this island the rocky coast changes to a sandy beach.
- 10 **Anchorage.**—Anchorage may be obtained by vessels with local knowledge, in smooth water, in the channel between Tomahoe eilanden and the coast of Boeroe, in depths of from 13 to 21 fathoms (23^m8 to 38^m4), mud and sand. There is a 10-foot (3^m0) patch, occasionally marked by discoloration, in the middle of the fairway about 1½ miles
- 15 from the southern extremity of Tengah, a 30-foot (9^m1) patch near the middle of the fairway about 4 cables eastward of the same point, and there are several sunken rocks in the southern approach. Vessels should enter the channel either northward of Tomahoe or between Tomahoe and Tengah, where the fairway in both channels is deep,
- 20 although only about 1½ and 2½ cables wide, respectively, between the drying reefs, which are marked by discoloration, on either side.

Pulau Tengah village (*Lat.* 3° 13' S., *Long.* 126° 00' E.) is situated at the northern end of Tengah. There is a small steep sandy beach here, off which a vessel may anchor, in a depth of 16 fathoms (29^m3).

- 25 Anchorage may also be obtained by small vessels with local knowledge, when the reefs are plainly visible, off Fogi village, about 2½ miles southward of Pulau Fogi.

- Tidal streams.**—The tidal streams inside Tomahoe eilanden are weak; in the northern entrance to the channel between Tomahoe and the coast, between Tomahoe and Tengah, and between the reefs southward of Tengah, a vessel approaching from outside is soon clear of the stream, which sets across the entrances.
- 30 The tidal streams off this coast set northward and southward at a moderate rate, and during the southerly monsoon there is a considerable sea and swell from southward.

- Coast.**—At Tanjong Sarmana, about 7½ miles south-south-eastward of Pulau Fogi, and at Tanjong Walimen, about 5 miles farther south-eastward, the land, thickly covered with vegetation, rises close within the beach. Tanjong Walwawat, 11 miles south-eastward of Tanjong
- 40 Walimen, is the southern extremity of a wide strip of low land, through which Wai Koema (Kuma) flows into the sea, the muddy waters of which extend for many miles offshore. Approaching from north-westward or south-eastward, a long row of isolated trees will be sighted on this point. The only anchorage, free from swell during the southerly
- 45 monsoon off this stretch of coast, is close off the coconut plantation of Wamsasi village, about 5 miles north-north-westward of Tanjong Walwawat.

- SOUTHERN SIDE OF BOEROE.**—Between Tanjong Walwawat and the entrance to Leksoela baai, about 21 miles south-eastward, the
- 50 most noticeable feature is Vlake van Mala, a plain extending some distance inland. Wai Mala flows out at Tanjong Wamala, a low point 10½ miles south-eastward of Tanjong Walwawat, and its muddy water extends some miles offshore. On either side of Vlake van Mala the

Chart 3241.

hills approach the coast, which is rocky in places. Tanjong Atjoe, about $2\frac{1}{2}$ miles south-eastward of Tanjong Wamala, is conspicuous from north-westward. Sanane, a hill, 968 feet (295^{m0}) high, close within Tanjong Atjoe, and on the western side of the entrance to Tifoe baai, is a good mark on account of its isolated position. 5

Anchorage may be obtained over a sandy bottom anywhere off this stretch of coast, under favourable conditions.

Off-lying dangers.—A detached reef, with a least depth of 26 feet (7^{m9}), lies about $1\frac{1}{2}$ miles south-south-westward of Tanjong Fatoefat, situated about $5\frac{1}{2}$ miles east-south-eastward of Tanjong Walwawat. A detached reef, with a depth of 39 feet (11^{m9}), lies about 2 miles westward of Tanjong Wamala. 10

Tifoe baai.—Tifoe baai, entered about half a mile eastward of Tanjong Atjoe, is free from swell and tidal stream, but the anchorage is very confined. During the southerly monsoon it is not always possible to enter the bay on account of its narrow entrance and the tidal stream which sets across the entrance. During this monsoon it is advisable to enter in the early morning if possible as the wind always increases in the course of the day. See view facing page 117. 20

A flag is displayed at the flagstaff on the eastern entrance point when it is unadvisable to enter, and a red flag is displayed when there is already a vessel in the bay.

Pulau Ketjil (*Lat. 3° 42' S., Long. 126° 24' E.*) lies on the northern side at the eastern end of the bay. Tifoe village, with a pier, lies on the southern side. 25

A vessel should approach the entrance at reduced speed and enter with only sufficient speed for steerage way. When Pulau Ketjil bears 060° she should steer for it on that bearing, and let go the starboard anchor when the point on the north-western shore, about $3\frac{1}{2}$ cables westward of the head of the pier, bears not less than 270°, or when the pier-head bears about 094°, veering about 27 fathoms (49^{m4}) of cable, and after swinging she should lay out a hawser to a tree on Pulau Ketjil. 30

Coast.—**Dangers.**—A shoal, with a depth of 13 feet (4^{m0}), lies about $3\frac{1}{2}$ cables offshore, $3\frac{1}{2}$ miles south-eastward of Tanjong Atjoe. About 2 miles farther south-eastward and about half a mile offshore there is a drying reef, marked by discoloration. 35

Leksoela baai.—**Danger.**—**Beacon.**—**Light.**—This bay, entered between Tanjong Kabat Roit, about $8\frac{1}{2}$ miles south-eastward of Tanjong Atjoe, and Tanjong Kabat Ha, about 7 cables farther south-eastward, is backed by high land. The entrance points, which are also high, are excellent marks for making the entrance. Méfa, 1,851 feet (564^{m2}) high, about $2\frac{1}{2}$ miles north-westward of Tanjong Kabat Roit, and Miten and Tef Doela, situated about 3 miles north-north-eastward and 6 miles eastward, respectively, of the same point, are fairly conspicuous mountains against the higher mountains farther inland. 40 45

A reef, on which there are some rocks above water, and with a depth of 10 feet (3^{m0}) at its outer end, extends about $3\frac{1}{2}$ cables east-south-eastward from Tanjong Kabat Roit; a reef, on which there is an islet on its outer end, extends about one cable northward from Tanjong Kabat Ha. 50

Midden eilandje, which is steep-to on its seaward side, is a high islet lying about 4 cables eastward of Tanjong Kabat Roit, and about

Chart 3241.

2 cables east-south-eastward of the islet there is a reef, which dries, marked on its western side by an iron beacon surmounted by a white ball.

- 5 A light is exhibited, at an elevation of 18 feet (5^m5), from a white iron framework structure, 13 feet (4^m0) in height, at the head of the bay, about a quarter of a mile south-eastward of Leksoela village, which is approached through an opening in the drying shore reef.

There is a landing pier with a depth of 6½ feet (2^m0) alongside, on the 10 north-western side of the bay, near the Government official's flagstaff.

The limit of the roadstead is the arc of an imaginary circle with a radius of 4,265 feet (1300^m0) and the light as centre.

- Anchorage.—Directions.**—Anchorage may be obtained in the middle of Leksoela baai, in a depth of about 19 fathoms (34^m7), mud. 15 During the strength of the South-east monsoon a vessel may anchor a little farther eastward, in a depth of 11 fathoms (20^m1), and during the North-west monsoon slightly farther north-westward, in a depth of 15 fathoms (27^m4).

- Batu Kapal, about 2½ miles east-south-eastward of Tanjong Kabat 20 Ha, lies on the southern end of a reef which extends about 1½ miles west-south-westward from the coast from a position about ¾ miles eastward of Tanjong Kabat Ha, and is a good mark for making the entrance. When the bay is well open, a vessel should steer for Midden eilandje, bearing about 022° until the light structure bears 038°, when 25 she should steer for the latter on that bearing, which leads between Midden eilandje and the beacon marking the discoloured drying reef east-south-eastward of it.

- Coast.**—The coast between Tanjong Kabat Ha and Tanjong Batoepekak (*Lat.* 3° 51' S., *Long.* 126° 44' E.), about 14 miles east- 30 south-eastward, is similar in character to that between Tanjong Walwawat and Leksoela baai. Tanjong Batoetoelis (Batutulis), about 6½ miles east-south-eastward of Tanjong Kabat Ha, is a high rocky point, and is the most conspicuous mark eastward of Batu Kapal.

- Anchorage may be obtained by vessels with local knowledge out of 35 the influence of the tidal stream, off the villages of Nalbesi and Wanala, situated about 2½ miles eastward and 10 miles east-south-eastward, respectively, of Tanjong Kabat Ha.

- About 2½ miles within the southern extremity of Boeroe, and at the head of Baai van Namrole, is Wa Leli gebergte, the summit of which, 40 lying about 2½ miles north-westward of Tanjong Batoepekak, is 1,812 feet (552^m3) high. Separated from the summit by a narrow depression, is a sharp peak, 1,040 feet (317^m0) high, lying about 7 cables east-south-eastward. On the western side of the ridge, and also separated from it by a depression, is a lower ridge, northward of which is Norolpi- 45 toe, 2,609 feet (795^m2) high.

- Baai van Namrole.—Danger.**—This bay, entered between Tanjong Watina, about 5 miles south-eastward of Tanjong Batoetoelis, and Tanjong Batoepekak, may be identified by the plain of the Wai Tina delta, with a conspicuous round-topped tree on the coast, on the 50 western side, and by the grey rocky cliffs of Tanjong Batoepekak, about 160 feet (48^m8) high, with Klasi, a rocky islet, close westward of it.

Loktonal, a white coral bank, which partly dries, lies in the middle of the entrance. Namrole village, off which there is no shore reef, stands on the north-western shore of the bay. The rounded coastal hills

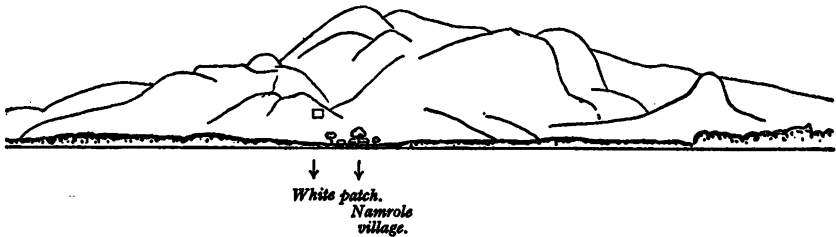
Chart 3241.

eastward of the village are noticeable as they are of a lighter colour than the adjacent land.

A strong stream sets in the deep channel between Klasi and the coast.

Anchorage.—Directions.—Anchorage may be obtained by vessels with local knowledge, in a depth of 16 fathoms (29^m3), sand and coral, in Baai van Namrole.

A vessel should approach the bay with the summit of Wa Leli gebergte bearing 000°, in line with Namrole village; which, however, is



Summit of Wa Leli in line with round-topped tree in Namrole village, bearing 000°.

(Original dated 1933.)

difficult to distinguish at a distance; after passing westward of 10 Loktonal on this leading line, she should steer for a white patch, situated about half a mile south-south-westward of the summit of Wa Leli gebergte, in line with a conspicuous knob on a lower ridge behind it, bearing 340°, which will lead to the anchorage.

Coast.—Between Tanjong Batoepakat and Tanjong Liboli, about 15 30 miles east-north-eastward, a massive ridge of mountains lies parallel to the coast, and attains an elevation of 5,677 feet (1730^m4) at its north-eastern end in Batak Boeal (Bual), 10 miles northward of Tanjong Liboli. The higher peaks of this ridge are usually obscured by clouds. Two peaks, 2,022 and 2,196 feet (616^m3 and 669^m4) high, about 2 miles 20 north-north-westward and 3½ miles northward, respectively, of Tanjong Salia, situated about 14 miles east-north-eastward of Tanjong Batoepakat, are good marks. The coast is bordered by an almost unbroken sandy beach, with low plains behind it.

Off-lying islet and dangers.—Oki, an islet, 490 feet (149^m3) high, 25 and thickly covered with vegetation, lies about one mile offshore about 7 miles east-north-eastward of Tanjong Batoepakat. Some rocks lie close southward of the islet.

Between Tanjong Batoepakat (Lat. 3° 51' S., Long. 126° 44' E.) and the islet Oki there is a ridge of reefs, with depths of from 2½ to 30 6 fathoms (5^m0 to 11^m0), lying from about one to 1½ miles offshore. Wajio riffen (Wayio reefs), with a least depth of 13 feet (4^m0), lies with its south-western and shoalest part 2 miles east-south-eastward of Oki. Belobo, a reef which dries, lies about 1½ miles west-south-westward of Tanjong Salia.

Anchorage.—Good anchorage may be obtained by vessels with local knowledge, over a sandy bottom, anywhere within the ridge of reefs between Tanjong Batoepakat and Oki. Reede Oki, between the islet Oki and the coast northward, affords anchorage to vessels with

Charts 942a, b, 2759a, 1263.

Chart 3241.

local knowledge, but there is a $2\frac{1}{2}$ -fathom (5^m0) coral patch in the middle of it.

A vessel proceeding to Reede Oki or to an anchorage westward of it should pass eastward of the islet Oki and thence between it and the $2\frac{1}{2}$ -fathom (5^m0) patch northward of it. If proceeding eastward from Reede Oki a vessel can pass between Wajio riffen and the rocky Tanjong Wajio (Wayio), northward of it, keeping moderately close to the latter.

10 Anchorage may be obtained by vessels with local knowledge, in a depth of 23 fathoms (42^m1), during the North-west monsoon, in the bight off Wamsisi village, close northward of Tanjong Salia, where the sea is calm. Also off Tanjong Polisini, about 10 miles north-eastward of Tanjong Salia, close westward of the mouth of Wai Loemara, in
15 depths of from 27 to 33 fathoms (49^m4 to 60^m4).

Tidal streams.—The tidal streams set parallel to the coast. Whirlpools are experienced off Tanjong Salia, and between Tanjong Liboli and Ambelau, an island about $8\frac{1}{2}$ miles southward; these latter are caused by the east-going tidal stream through the passage meeting
20 the south-going stream in Straat Manipa. During the West monsoon there is sometimes a strong drift setting eastward in this passage, and westward during the East monsoon.

Ambelau.—This island rises nearly vertically from the sea on all sides, attaining an elevation of 1,992 feet (607^m1) in Baoela (Baula), in
25 the western part of the island. The only flat parts of the island are at Waloa village, on the south coast, where there is a small inlet, which



Ambelau, bearing 350° , 30 miles.

(Original dated 1933.)

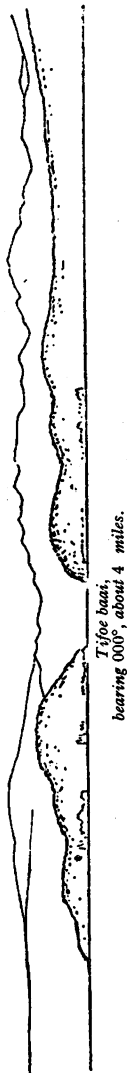
dries, available for praus, and at the villages of Negeri Baroe and Oelima (Ulima), on the north coast, where there are small sandy beaches. The island is wooded, and wild hogs abound.

30 **EASTERN SIDE OF BOEROE.**—**Coast.**—Between Tanjong Liboli (*Lat. $3^\circ 40' S.$, Long. $127^\circ 11' E.$*) and Baai van Kajeli (page 110). The eastern side of Boeroe is mountainous and desolate, with spurs reaching the coast in the vicinity of the rocky points Tanjong Liboli, Tanjong Saroma, about 2 miles east-north-eastward, and Tanjong
35 Tapan, about $1\frac{1}{2}$ miles farther north-eastward, and also eastward of the southern side of Baai van Kajeli. In between there is gently sloping land with sandy beaches. A hill, 513 feet (156^m4) high, just within Tanjong Pohonrea, about 5 miles north-north-eastward of Tanjong Tapan, is conspicuous. Fatoe (Fatu) Kapal, a rock close offshore,
40 about 8 cables north-north-eastward of Tanjong Tapan, is seldom visible.

Kak Remat, 3,275 feet (998^m2) high, $3\frac{1}{2}$ miles north-westward of Tanjong Tapan, disappears from view when Tanjong Saroma has been rounded from southward. Batak Boeal, the highest peak in this
45 mountainous region, has been mentioned on page 115. Koekoesan

Charts 942a, 2759a, 1263.

To face page 117.



*Tifoe baai,
bearing 000°, about 4 miles.*

South coast of Boeroe.—Approach to Tifoe baai from southward.
(Original dated 1933.)



Manipa, bearing 337°, 28 miles.
(Original dated 1933.)



Boano, bearing 225°, 13 miles.
(Original dated 1933.)

Chart 3241.

(Kukusan), about $5\frac{1}{2}$ miles northward of Batak Boeal, has two peaks in the form of a sugar-loaf, the higher and southern of which is 2,032 feet (619^m4) high.

Anchorage.—Anchorage may be obtained by small vessels with local knowledge, in depths of from 27 to 38 fathoms (49^m4 to 69^m5), off Ilat village, about $1\frac{1}{2}$ miles southward of Tanjong Pohonrea, out of the tidal streams, with Tanjong Pohonrea in line with Tanjong Kajoeputih (Kayuputih), about 10 miles northward, bearing about 007°. A vessel should approach with an isolated hut, situated close northward of the village, in the middle of the shore of the bay, bearing 270°. The mouth of a creek lies close southward of the hut, and close northward of it is a fairly large tree with coconut trees in front of it. In calm weather, a vessel can anchor farther southward, nearer Ilat village, in depths of from 19 to 22 fathoms (34^m7 to 40^m2). 5 10 15

Anchorage may also be obtained off Batoedjoengko (Batujungko) village, about $2\frac{1}{2}$ miles south-south-westward of Tanjong Kajoeputih, about one cable north-eastward of some detached rocks which lie close northward of the village, in a depth of about 11 fathoms (20^m1).

Tidal streams.—Strong tidal streams set along the eastern coast of Boeroe, a maximum rate of 3 knots having been observed 5 days after new moon with the stream setting north and north-west, and one knot with the stream setting south and south-west, which was of shorter duration than the former. 20

ISLANDS AND CHANNELS BETWEEN BOEROE AND CERAM.—**Straat Manipa.**—This wide passage connecting Ceram and Banda seas, lies between the eastern end of Boeroe and Manipa, and is clear of dangers in the fairway. Strong tidal streams set through this strait and the other channels between Boeroe and Ceram. When proceeding from north to south during the South-east monsoon it is advisable to keep to the Boeroe side, and during the North-west monsoon to the Manipa side. In the strength of the monsoons, however, when there may be a high sea running, preference should be given to Straat Kelang (page 118). 25 30

Manipa.—**Light.**—This island is mountainous; Kala Hoehoen (Huhun), its summit, has two peaks, the north-western and higher having an elevation of 2,071 feet (631^m3). There is a small plain on the southern side of the island, where there are a few villages. Masawoi and Asamamanoeke, close westward of it, are islets lying on a reef close off the northern coast, and Loehoe (Luhu) and Toeбан (Tuban) lie close off the north-eastern and southern coasts, respectively. There is a channel between Toeбан and the coast, which is accessible to vessels with local knowledge. A shoal, with a least depth of 6 feet (1^m8), lies about three-quarters of a mile westward of Toeбан, and foul ground, with a depth of 15 feet (4^m6) at its outer end, extends nearly one mile southward from the same islet. See view facing this page. 35 40 45

A light (*Lat.* 3° 18' S., *Long.* 127° 28' E.) is exhibited, at an elevation of 305 feet (93^m0), from a white iron framework structure, 69 feet (21^m0) in height, from the north-eastern summit of Soeanggi (Suanggi), an islet lying nearly one mile westward of Tanjong Hapale, the western extremity of Manipa. 50

Anchorage may be obtained off the western and southern coasts of Manipa. Anchorage is not recommended off the north-eastern coast

Chart 3241.

owing to the strong tidal streams, which set southward along that coast ; a rate of from 5 to 6 knots has been observed north-westward of Tanjong Samala, the south-eastern extremity.

- 5 **Kelang.**—This island is mountainous and sparsely populated. Tonoe, its summit, is an old volcano, 2,714 feet (827^m3) high. Solè, the largest village, is on its north-eastern coast. Kelang is separated from the north-eastern side of Manipa by Straat Kelang, which is 4½ miles wide. See views facing this page.
- 10 A maximum rate of the tidal streams of from 5 to 6 knots has been observed in the strait off Tanjong Saniani, the western extremity of Kelang, and Tanjong Samala.

- Anchorage may be obtained off the northern coast, westward of Tanjong Batogoso, the northern extremity of the island, except
15 during the strength of the North-west monsoon ; also off Pamariki village, about 2½ miles westward of Tanjong Lalola, the south-eastern extremity of the island. Anchorage may be obtained off the eastern coast, northward of the parallel of Tonoe.

- Babi, an island lying close off the north-eastern side of Kelang, is
20 hilly, but relatively low. Its eastern end is separated from Tanjong Haja (Haya), the western extremity of Ceram, by Lobang Haja (Lobang Haya), a narrow passage, which should only be used by small vessels with local knowledge, with a draught of not more than 11 feet (3^m4) ; the tidal streams in it attain a maximum rate of 6 knots.
- 25 Lobang Solè, the narrow passage between Kelang and Babi, should not be attempted on account of the strong tidal streams, which sometimes cause heavy whirlpools.

- Boano.**—**Dangers.**—This island, about 8 miles north-north-eastward of Kelang, is high and serrated on its western side ; it has
30 a conspicuous small cone, 2,045 feet (623^m3) high, on this side, but its flat eastern side is not more than about 200 feet (61^m0) high. Tanjong Hatoe Alang, the south-western extremity, is rocky and conspicuous. Poea (Pua), an island, 1,320 feet (402^m3) high, lies close off the north-western side of Boano, the passage between being encumbered with
35 reefs ; the northern end of the passage leads into an inlet, but it is not navigable on account of the reefs in it. See view facing page 117.

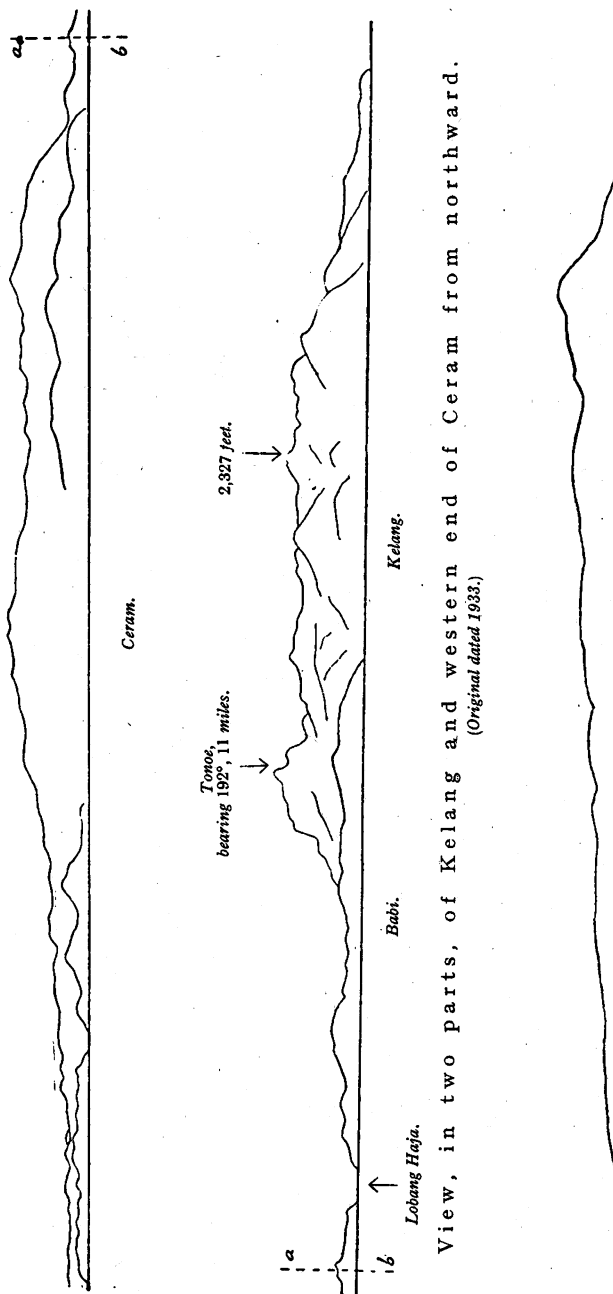
- A 6-fathom (11^m0) patch lies about 2 miles north-westward of the south-western extremity of Poea (*Lat.* 2° 57' S., *Long.* 127° 53' E.), and a 5-foot (1^m5) patch lies about 1½ miles north-north-westward of the
40 same point. Between these patches and Poea there are other dangers. Shoals, with depths of from 3½ to 4½ fathoms (5^m9 to 7^m8), lie about 1½ miles off the western side of Boano southward of Poea ; this coast should not be approached within 3 miles.

- Boano is sparsely inhabited, the two principal villages being on the
45 south-eastern coast.

Charts 3241, 3242.

- CERAM.**—A range of mountains of irregular formation and with numerous peaks, extends throughout the entire length of the island and attains its maximum elevation in the middle, but from a distance there
50 are few landmarks. A coastal reef extends offshore in places, but vessels can generally navigate close to the coast. Earthquakes occur frequently, and are felt less frequently on the north coast than on the south. Volcanic mud is found near the oil fields at Boela (page 125)

Charts 942a, 2759a, 1263.



Charts 3241, 3242.

on the east coast. Definite volcanic eruptions are unknown, but destructive earth tremors have been experienced at times.

The tidal streams, except in the straits and narrows, are weak.

Chart 3241.

WESTERN SIDE OF CERAM.—Sstraat Boano.—Sstraat Boano, between Boano and the coast of Ceram, is about $4\frac{1}{2}$ miles wide and clear of dangers in the fairway, but at its south-western end, the navigable channel is reduced to a width of about 3 miles by several islets and shoals which extend from the north-western side of Schiereiland Hoalmoal. 5

A vessel from northward, after passing Tanjong Pamali, the low north-eastern extremity of Boano, off which there is a 10-foot (3^m0) patch, should keep on this side of the strait as far as Tanjong Hena-poetih, the steep south-eastern extremity. The land within the coast of Ceram is mountainous and wooded, but without any conspicuous peaks. The only noticeable hills on this coast are Asaoedi, 618 feet (188^m4) high, about 8 miles north-eastward of Tanjong Haja, and a hill, 588 feet (179^m2) high, about one mile south-westward of Asaoedi. 15

Between Tanjong Tandoeroe Besar, the conspicuous high and steep north-western extremity of Ceram, and Tanjong Haja, there are several inlets, off which there are many islets and dangers. The hills slope down to the coast in many places, but the shores of the larger inlets are marshy and bordered with mangroves. See view facing page 121. 10

Anchorage.—Anchorage may be obtained off Kawa village, about $4\frac{1}{2}$ miles south-south-westward of Tanjong Tandoeroe Besar, during the South-east monsoon, in a depth of about 16 fathoms (29^m3), mud, stones and sand, with Sirih, a rocky islet, situated close off Tanjong Nonoherana, about 3 miles south-westward of Tanjong Tandoeroe Besar, bearing 347° . Elsewhere in this inlet there is good holding ground in any required depth. In depths of less than 5 fathoms (9^m1), the bottom slopes steeply to the sandy beach. 25

The large inlet eastward of Marsegoe, an island situated on the eastern side of Sstraat Boano nearly 7 miles south-westward of Tanjong Nonoherana (*Lat. $2^\circ 54' S.$, Long. $128^\circ 08' E.$*), affords a better anchorage than that in Baai van Kotania southward of it, as it is clear of dangers. Anchorage may be obtained off the northern edge of the drying reef which extends westward from Tanjong Lalansoai, in depths of from 22 to 30 fathoms (40^m2 to 54^m9). The best anchorage in this inlet is in the north-eastern cove, in a depth of 20 fathoms (36^m6), off the mouth of Wai Tosoe. A vessel entering this inlet from northward should avoid the drying reef which extends a short distance from Tanjong Wanteboe, the northern entrance point. The muddy shore of the inlet is covered with mangroves. 35

Baai van Kotania, entered between Tanjong Lalansoai and Tanjong Tapi, about 6 miles south-westward, is encumbered with numerous reefs. Kotania village, at the head of the bay, can only be reached by small vessels with local knowledge. Anchorage may be obtained, in depths of from 22 to 27 fathoms (40^m2 to 49^m4), sand, in the outer part of the bay, westward of the alignment of the eastern extremity of Marsegoe and Tanjong Wanteboe, bearing 021° . A vessel of shallow draught can approach this anchorage from northward by passing between Marsegoe and the drying reef on which are some islets, extend- 40

Chart 3241.

ing about $1\frac{1}{4}$ miles from Tanjong Lalansoai, but there is a rocky reef, with a depth of $3\frac{1}{4}$ fathoms (5^m9) in it, on the Marsegoe side of the fairway.

- 5 A vessel approaching Baai van Kotania from westward should steer for Boental, a conspicuous islet, 290 feet (88^m4) high, on a reef, situated about 2 miles southward of Tanjong Lalansoai, bearing 090° , until the eastern extremity of Tikoës, a low islet close off the southern shore, about $1\frac{1}{4}$ miles eastward of Tanjong Tapi, is in line with Maroeing, 10 a mountain, 1,408 feet (429^m1) high, bearing about 149° , when she should steer 060° for the anchorage. Care must be taken not to get eastward of the alignment mentioned above.

Chart 911, plan of Asaoedi road.

- Anchorage may be obtained in Reede Asaoedi, southward of Asaoedi, 15 an islet, 247 feet (75^m3) high, situated about $4\frac{1}{2}$ miles south-westward of Tanjong Tapi, in a depth of about 21 fathoms (38^m4), mud and sand, about $6\frac{1}{4}$ cables offshore westward of Asaoedi village.

Chart 3241.

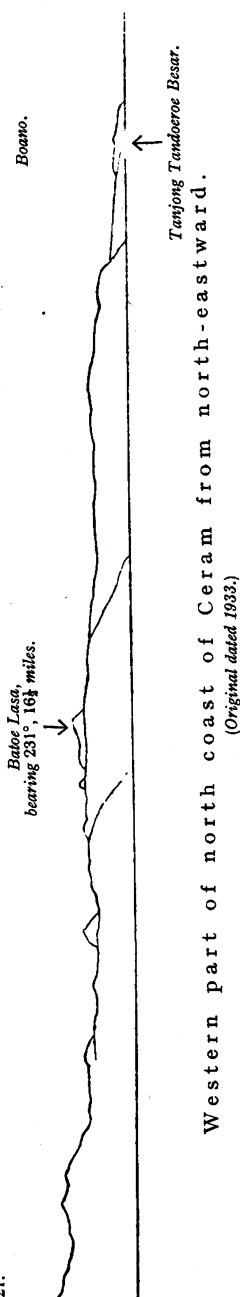
- Coast.**—The coast between Tanjong Haja and Tanjong Sial, about 20 25 miles south-south-eastward, which forms the western side of Schiereiland Hoalmoal, can be approached closely everywhere southward of Lobang Haja (page 118). The western side of this peninsula is covered with forest and rises to mountainous land without any conspicuous peaks. There are few inhabitants, the only village of any 25 importance being Soepe (Supe), about $4\frac{1}{2}$ miles south-south-eastward of Tanjong Haja. The eastern side of the peninsula is described on page 127.

- A strong tidal stream may set round Tanjong Sial, about 2 cables off which there is a dangerous rock awash. Elsewhere eastward of a line 30 joining Tanjong Hatoeloeta, situated 5 miles north-north-westward of Tanjong Sial, and Tanjong Tohosoë, on the southern side of Kelang, about $5\frac{1}{4}$ miles westward of Tanjong Lalola (*Lat. $3^\circ 15' S.$, Long. $127^\circ 47' E.$*), the streams are weak, except in the approach to Lobang Solè and Lobang Haja.

35 *Chart 3242.*

- NORTHERN SIDE OF CERAM.**—**Coast.**—Between Tanjong Tandoeroe Besar and Tanjong Namaä, a low point, about 54 miles eastward, the coast is clear of dangers, except for Telegraaf rif (page 121) and Lasi (page 121). The mountains approach the coast in many 40 places, interspersed with low plains, through which some rivers flow, and in which there are coconut plantations. There are many villages on this coast. Most of the coastal hills and mountains can be easily identified, the most conspicuous being Groote Dromedaris (Great Dromedary), 2,285 feet (696^m5) high, and Kleine Dromedaris (Lit. 45 Dromedary), 1,550 feet (472^m4), situated about 23 and 25 miles, respectively, eastward of Tanjong Tandoeroe Besar. These mountains bear some resemblance to the animal after which they are named. Nakaëla, 2,600 feet (792^m5) high, about 4 miles west-south-westward of Groote Dromedaris, has a flat summit. Farther inland and within 50 about 8 miles south-eastward of Groote Dromedaris are the Cecilia gebergte, which attain an elevation of 4,440 feet (1353^m3). Loemoeté (Lumute) gebergte is a long ridge about 8 miles eastward, and of about the same elevation as Cecilia gebergte, but is less conspicuous.

Charts 942a, b, 2759a, 1263.



Walakone.
Sosokodtai.

Rapinane,
bearing 192°, 3·3 miles.

North coast of Ceram.—Approach to Soekaradja from northward.
(Original dated 1933.)
Selman geberge.

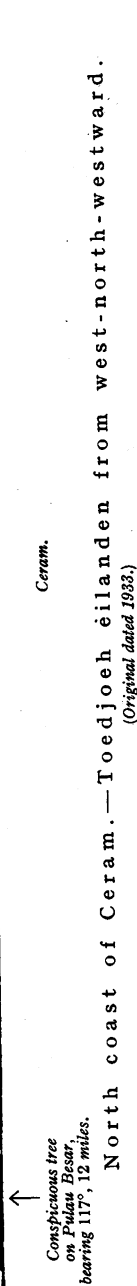


Chart 3242.

Tidal streams.—Current.—The tidal streams close off this stretch of coast are moderate or weak, except off Tanjong Tandoeroe Besar, where they set strongly through Straat Boano.

Off the northern coast of Ceram counter currents prevail close 5 inshore during the South-east monsoon.

Anchorage.—Anchorage may be obtained close off the mouths of the rivers between Tanjong Kalawai, situated about 6 miles eastward of Tanjong Tandoeroe Besar, and Tanjong Hanoea, about 6 miles farther eastward, and close off all the points between the latter and the 10 Toedjoeh eilanden.

Temporary anchorage may be obtained in the following positions :—
Off Noniali village, about $2\frac{1}{2}$ miles eastward of Tanjong Hanoea, in a depth of about 30 fathoms (54^m9), about one cable offshore. Westward of Tanjong Lamana, about 10 miles eastward of Tanjong Hanoea, 15 in a depth of 24 fathoms (43^m9), coral and sand, about a quarter of a mile from the drying coastal reef. Northward of Tanjong Oeli (Uli), about 9 miles eastward of Tanjong Lamana, in a depth of 30 fathoms (54^m9), coral and sand, about a quarter of a mile offshore. Off Soekaradja village, about 3 miles east-south-eastward of Tanjong Oeli, 20 in a depth of 20 fathoms (36^m6), with Rapinane, a hill, 622 feet (189^m6) high, about one mile south-south-westward of the village, bearing 192° . (See view facing this page.) Northward of Tanjong Makina, $5\frac{1}{2}$ miles eastward of Tanjong Oeli, in a depth of 30 fathoms (54^m9), coral and sand, about a quarter of a mile offshore. Off Lisabata village, situated 25 about half a mile eastward of the creek Wae Ela, situated about 7 miles eastward of Tanjong Makina, in a depth of 20 fathoms (36^m6), mud and sand, about $1\frac{1}{2}$ cables offshore.

Off-lying islands and dangers.—Toedjoeh eilanden (Pulau Tujuh), consisting of six low, partly inhabited islands, lie within 5 miles 30 of the coast. On the northern end of Besar, the northernmost island of the group, there is a large fan-shaped tree. See view facing this page.

Telegraaf rif, with a depth of 9 feet (2^m7), lies nearly 3 miles north-westward of Tanjong Sapola (*Lat. $2^\circ 50' S.$, Long. $128^\circ 58' E.$*), situated about 13 miles eastward of Tanjong Makina. This danger and the reefs 35 fringing the islands, especially that around Alai, about half a mile southward of Air, are well marked by discoloration. Lasi, a drying coral and mud bank, about half a mile offshore and $4\frac{1}{2}$ miles eastward of Telegraaf rif, is not usually marked by discoloration at high water.

Directions.—The most suitable passage through these islands, both 40 by day and night, is that between Air and Tengah. Approaching from westward, the Toedjoeh eilanden are difficult to distinguish at night against the background of the high coast of Ceram. From eastward, the islands can be safely approached on a clear night.

A small vessel with local knowledge approaching from westward 45 should keep Tanjong Gale Gale, situated about one mile westward of Tanjong Namaä, in line with the north-western extremity of Esaoe, bearing about 066° , so as to avoid the dangers off Lisila until the western extremity of Itoea is in line with the eastern extremity of Besar, bearing about 357° , when she should steer for the north-western 50 extremity of Tengah, bearing about 055° , which leads south-eastward of Lasi, thence she should keep in mid-channel southward of Tengah and Esaoe, and parallel with the coast of Ceram.

A vessel approaching from eastward after passing in mid-channel

Chart 3242.

southward of Esaoe and Tengah and parallel with the coast of Ceram, should continue westward until the eastern extremity of Itoea is nearly in line with the eastern extremity of Besar, bearing about 346° , when
 5 she should keep Tanjong Gale in line with the north-western extremity of Esaoe, astern, bearing about 066° , which leads clear of Lasi, and the reef close northward of Tanjong Sapola, about $3\frac{1}{2}$ miles south-westward of Tanjong Gale.

Seléman baai.—This bay is entered between Tanjong Namaä and
 10 Tanjong Pamali, a low point, about 19 miles eastward, with light-coloured hilly land behind it. At the head of the bay the mountains approach the coast, especially at, and westward of, the peninsula, on which stands Olat, a hill, 590 feet (179^m8) high, situated about 12 miles south-eastward of Tanjong Namaä. Loesiala, a pyramidal-shaped hill,
 15 1,441 feet (439^m2) high, lies close inland, about 5 miles westward of Olat. Saka, or Piek van Seléman, 4,893 feet (1491^m3) high, with a conspicuous blunt summit, lies about $2\frac{1}{2}$ miles southward of Loesiala. The two Poetih (Putih) summits, 5,437 and 6,313 feet (1657^m2 and 1924^m2) high, separated from each other by a depression, lie about
 20 $3\frac{1}{2}$ and $4\frac{1}{2}$ miles south-south-westward of Olat, and are the spurs of the high land which extends about 20 miles east-south-eastward, and which rises gradually to Binaija (page 131). Sapolewa, a hill 700 feet (213^m4) high, lies on the south-eastern side of the bay, about $1\frac{1}{2}$ miles inland, 5 miles east-north-eastward of Olat. Elsewhere the western and
 25 eastern sides of the bay are bounded by a low plateau with hills.

There is excellent anchorage everywhere close offshore between Tanjong Pamali (*Lat.* $2^{\circ} 48' S.$, *Long.* $129^{\circ} 22' E.$) and Baai van Besi, about 12 miles south-westward.

Anchorage may be obtained in Reede Paoni, about $4\frac{1}{2}$ miles south-
 30 ward of Tanjong Namaä, but there are four reefs, with depths of from 6 to 10 feet (1^m8 to 3^m0), not marked by discoloration, lying within 3 cables of the coast. There are several creeks northward of Paoni village, only the northward of which is accessible for boats, and that only for a short distance.

35 Anchorage may be obtained off Seléman village, about half a mile eastward of Loesiala, with a conspicuous mosque bearing 206° , on which bearing a vessel should approach, which leads between two shoals, with depths of $2\frac{1}{2}$ and $4\frac{1}{2}$ fathoms (5^m0 and 8^m7), not marked by discoloration, lying about $2\frac{1}{2}$ and $3\frac{1}{2}$ miles, respectively, eastward of
 40 Tanjong Talitetoëi, situated about $7\frac{1}{2}$ miles southward of Tanjong Namaä.

Chart 930, plan of Sawai and Bèsi bays.

Baai van Sawai and Baai van Besi.—These bays lie on the western and eastern sides, respectively, of the peninsula extending
 45 northward from the head of Seléman baai, and on which the hill Olat stands.

Baai van Sawai is sheltered on its northern side by an extensive drying reef, on which stand Radja (Raja) and Sawai, low islets thickly covered with mangroves.

50 A vessel approaching this bay should steer for the conspicuous mosque in Seléman village, bearing 206° , until the northern extremity of Radja bears about 076° , when she can alter course for the entrance, and pass close to Tanjong Hatoe Soepoen (Hatu Supun) and along the southern shore of the bay.

Chart 930, plan of Sawai and Bèsi bays.

Baai van Besi is fronted by a number of reefs which dry, on which are Loesaolat (Lusaolat) and Loesahiti (Lusahiti), low islets covered with coconut trees, and by Sialoemaina, a sand bank covered with low shrubs, the positions of which may best be seen on the plan. The best approach is eastward of Loesaolat, the easternmost islet, but the passage westward of this islet is also safe when the reefs are plainly visible.

Chart 930, plan of Wahai and Hatiling bays.

Baai van Wahai.—Light.—Dangers.—Beacons.—This bay, entered about 8 miles eastward of Tanjong Pamali, is formed by the western of the two gaps in the coastal coral reef lying between Tanjong Lamakika, a low point about 7 miles east-north-eastward of Tanjong Pamali, and Tanjong Hewal, about $3\frac{1}{4}$ miles east-north-eastward. The edge of the reef on the western side of the fairway is marked by two iron beacons, each surmounted by a white ball, and that on the eastern side by three iron beacons, each surmounted by a black cone. There is a 9-foot (2^m7) patch about half a cable southward of the outer beacon on the eastern side of the entrance.

The limit of the roadstead is the arc of an imaginary circle with a radius of 3,281 feet (1000^m0), and the light structure as centre.

At the head of the bay there is a pier, on the head of which there is a white shed, and a light, which is exhibited, at an elevation of 22 feet (6^m7), from a mast. Wahai village stands on the slope of rising ground at the head of the bay, with the villages Hatoewoe and Hatiling close westward of it. A vessel, 164 feet (50^m0) in length, with a draught of 10 feet (3^m0), can lie at the head of the pier.

There is a Government official at Wahai.

Pamali, a hill, 177 feet (53^m9) high, which lies about 3 cables east-north-eastward of the head of the pier, is conspicuous.

Rainfall.—See page 25.

Anchorage.—Directions.—Anchorage may be obtained in Baai van Wahai, with the western gable of the white shed on the pier in line with the middle of the three beacons surmounted by a cone, about 2 cables north-north-westward of the pier-head, bearing 154° , in depths of from 22 to 27 fathoms (40^m2 to 49^m4).

A vessel approaching the bay from westward or eastward will easily identify Tanjong Hewal (*Lat. $2^\circ 46'$ S., Long. $129^\circ 32'$ E.*), which is low and covered with mangroves; if approaching from northward, Wahai is less easy to distinguish. At a distance of about 10 miles, in clear weather, Tanjong Hewal appears as an islet lying off the hilly land southward, which extends eastward and westward and shows fairly plainly against the mountains farther inland. On opening the bay, the white shed on the pier, the zinc roofs of the buildings, and the flagstaff at Wahai will be seen. The vessel should approach the anchorage on the leading line mentioned above.

Baai van Hatiling.—Dangers.—This bay is entered between Tanjong Hewal and the reef extending $6\frac{1}{4}$ cables northward from Tanjong Aentopra, about $1\frac{1}{4}$ miles south-westward; although more spacious and easier to enter than Baai van Wahai, it is seldom visited.

Shoals, with depths of $3\frac{1}{2}$ and $4\frac{1}{2}$ fathoms (6^m8 and 8^m7) lie about 5 cables westward of Tanjong Hewal.

A reef, which dries, lies in the middle of the bay, eastward of Tanjong Aentopra, with a least depth of $3\frac{1}{4}$ fathoms (5^m9), about three-quarters of a cable north-north-westward and north-north-eastward of it;

Chart 930, plan of Wahai and Hatiling bays.

about $1\frac{1}{2}$ cables eastward of this reef there is another small patch which dries. Vessels should pass westward of these reefs.

Chart 3242.

- 5 **Coast.**—Between Tanjong Hewal and Tanjong Lama, about 51 miles east-south-eastward, the coast is low and uniformly covered with vegetation, and is fringed by a narrow, steep-to bank, which dries nearly everywhere, consisting principally of mud and sand; coral only occurs occasionally. The thick vegetation, which usually grows as far
10 as the high-water line, makes it difficult to identify the points of land unless navigating close offshore.

- Within the coast there is a wide plain with low hills, which ascends farther inland to uniformly higher land, of which the only conspicuous features are Tomo, 1,333 feet (406^m3) high, $8\frac{1}{2}$ miles south-south-
15 westward of Tanjong Hewal, and Talirin, a double-peaked mountain, of which its higher and southern peak has an elevation of 887 feet (270^m4), situated about $3\frac{1}{2}$ miles south-south-eastward of Tanjong Lama. Farther inland, Loela, a blunt peak, 3,335 feet (1016^m5) high, about $2\frac{1}{2}$ miles westward of Leroea, situated 29 miles south-westward of
20 Tanjong Lama, and Balimaklam, 2,954 feet (900^m4) high, with a small conical peak on a mountain ridge, $9\frac{1}{2}$ miles eastward of Leroea, are the most conspicuous mountains. See views facing this page.

- The best positions for anchoring are in the bights off the small villages of Pasahari, $7\frac{1}{2}$ miles south-eastward of Tanjong Hewal, Seliha, at the
25 head of a bay, about 11 miles farther south-eastward, and Bengoi, near the head of a bight about 10 miles westward of Tanjong Lama. There are several rivers which flow out on this coast, but they can only be entered by boats on account of their shallow bars.

- Tanjong Lama and Tanjong Bobo, about 2 miles east-south-eastward,
30 are low and conspicuous, with steep-to coastal banks of mud and sand. The bight formed between these points affords sheltered anchorage during the South-east monsoon, in a depth of 23 feet (7^m0), north-north-eastward of the mosque in Hoti village at the head of the bight.

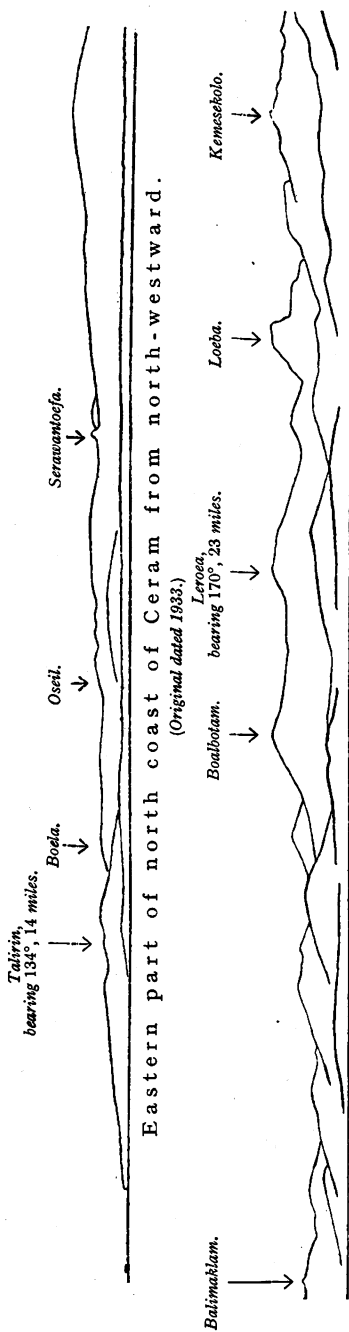
- Tidal streams.**—The tidal streams close offshore are moderately
35 strong; in depths of over 100 fathoms (365^m8) the monsoon drift may be experienced. In June a constant easterly stream with a rate of one knot has been observed off the north-eastern extremity of Ceram.

- Off-lying danger.**—Leeuwarden rif or Karang Bais, which dries and is marked by discoloration, lies about 6 miles east-north-eastward
40 of Tanjong Lama; this reef is steep-to.

- EASTERN SIDE OF CERAM.—Coast.**—Between Tanjong Bobo and Tanjong Ilor (*Lat. $3^{\circ} 25' S.$, Long. $130^{\circ} 48' E.$*), about 36 miles south-eastward, the coast is bordered by an alternately wide and narrow low plain, which rises within to hilly land with an occasional
45 conspicuous peak; of these, besides Talirin (described above), there are Boela (Bula), 1,602 feet (488^m3) high, $9\frac{1}{2}$ miles south-eastward; a hill, 385 feet (117^m3) high, with a conspicuous tank on it, about 8 miles south-south-eastward of Boela; two peaks, 487 and 438 feet (148^m4 and 133^m5) high, about 5 and $6\frac{1}{2}$ miles, respectively, farther
50 south-south-eastward; and Keli Doekoen (Keli Dukun), 319 feet (97^m2) high, about $4\frac{1}{2}$ miles westward of Tanjong Ilor. See views facing this page.

Farther inland, about $6\frac{1}{2}$ miles westward of Boela, are Serawantoeffa

Charts 942b, 2759a, 1263.



Ceram.—Mountains from northward.
(Original dated 1933.)

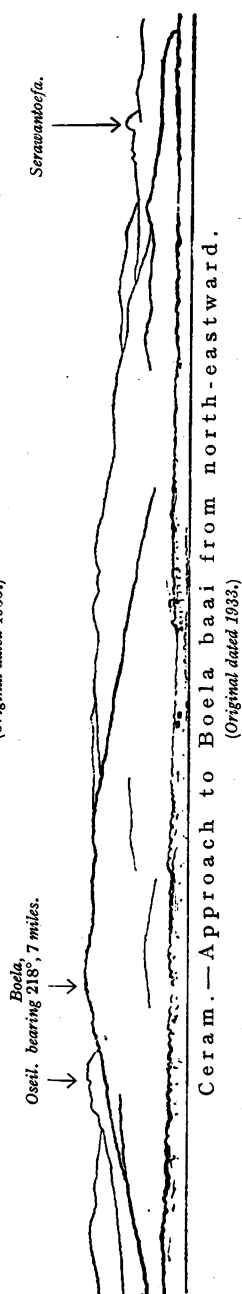
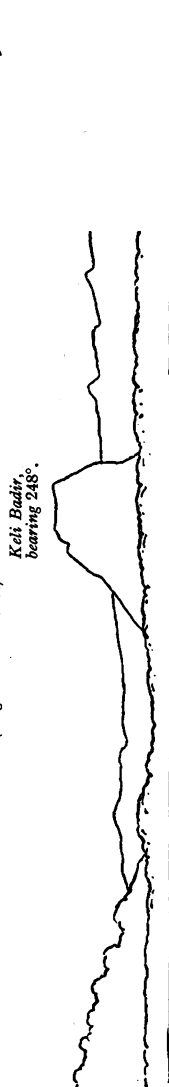


Chart 3242.

or Fat Eli, 1,681 feet (512^m4) high, which is conspicuous from north-eastward owing to its sugar-loaf shape; the Waelila gebergte, the south-eastern peak of which, situated 16½ miles westward of Tanjong Ilor, is more conspicuous than the north-western; and Keli Badir, 966 feet (294^m4) high, with a steep cone rising in the midst of inconspicuous hills, 6½ miles south-westward of Tanjong Ilor. 5

Except along the southern shore of Waroe baai (*see* below) the coast is clear of dangers outside its steep-to drying bank, which consists mostly of mud and sand. There is, however, a 10-foot (3^m0) patch lying close offshore about 3½ miles southward of Tanjong Bolifar, a low point situated about 17 miles south-eastward of Tanjong Bobo. 10

Several rivers flow out between Tanjong Lama and Waroe baai, but they are of no importance to navigation. The principal place on this sparsely inhabited coast is Boela. Good anchorage may be obtained anywhere off this coast during the North-west monsoon and in the transition months. 15

Chart 930, plan of Ingelas bay.

Ingelas baai.—This bay is entered between Tanjong Toefa (Tufa), about 4½ miles south-eastward of Tanjong Bobo, and Tanjong Sisal, about 2 miles farther south-eastward. The shores are low, but rise close within, and are bordered by a narrow bank of mud and sand which is steep-to. During the South-east monsoon the sea is calm, and during the North-west monsoon it is more sheltered than in Boela baai, in which there may be a high sea. 25

Anchorage may be obtained, in depths of from 6½ to 7 fathoms (11^m9 to 12^m8), about 3 cables offshore. A vessel should enter with Serawantoea (chart 3242) bearing 220°, taking care to avoid the mud and sand spit which extends about 1½ cables from Tanjong Sisal. 30

Chart 911, plan of Bula bay.

Boela baai.—**Light.**—Boela (Bula) baai, entered between Tanjong Waelola, about 1½ miles south-eastward of Tanjong Sisal (*Lat.* 3° 03' S., *Long.* 130° 28' E.), and Tanjong Namatimor, about 4½ miles farther south-eastward, can be identified from a considerable distance by the red roofs of the settlement and a few scattered tanks at the head of the bay. *See* view facing page 124. 35

There is a pier at the settlement; with a depth of about 27 feet (8^m2) at its head, from which a light is occasionally exhibited. There is a conspicuous flagstaff near the root of the pier.

The limit of the roadstead is the arc of an imaginary circle with a radius of one mile and the root of the pier as centre.

There are some mooring buoys off the pier.

Anchorage may be obtained, in a depth of about 12 fathoms (21^m9), soft mud, with the pier-head bearing 174°, distant about 2 cables. A vessel approaching from southward or eastward should steer for Serawantoea (chart 3242) bearing 248° until the pier is identified. The holding ground is not so stiff as it is in Ingelas baai. 45

Boela is the headquarters of a Government official. There is a medical officer and a hospital.

Water can be obtained from pipes laid on to the pier. Vessels up to 13,000 tons can moor alongside the pier. 50

Chart 3242.

Waroe baai.—**Beacons.**—This bay lies at the head of the bight entered between Tanjong Meer, situated about 8 miles southward of

Chart 3242.

Tanjong Bolifar, and Tanjong Ilor. The southern shore is fringed by a coral reef, which extends as much as one mile offshore and is marked at its edge by several unofficial beacons.

- 5 Off Waroe village, at the head of the bay, where there is a small pier, there is no coastal reef, but there is a sandy beach which dries out to a distance of about one cable at low water, when it cannot be reached by boat. Vessels may obtain anchorage, in a depth of about 16 fathoms (29^m3), mud, off Waroe village. There are a number of small villages
10 standing in coconut plantations on the shores of Waroe baai and northward of it.

Off-lying island.—Parang, an island 450 feet (137^m2) high, lies about 4½ miles northward of Tanjong Ilor, with a clear channel in the fairway between. It is surrounded by reefs which mostly dry, and, on
15 the north-western side, lie about one mile offshore, and are steep-to.

Tidal streams.—The tidal stream off the east coast of Ceram sets northward or north-eastward with the rising tide, and in the contrary direction with the falling tide.

- Coast.**—Tanjong Ilor is low, but there are some high casuarina trees
20 on it, which render it conspicuous. The coast between this point and Tanjong Danama, 11½ miles south-south-eastward, is occupied by the wide plain of the Wai Masiwang. Keli Badir (page 125), 6½ miles south-westward of Tanjong Ilor, is inconspicuous from south-eastward. A conspicuous tree stands on the coast about 3½ miles southward of
25 Tanjong Masiwang.

- Oerlin (Urlin) rif lies about three-quarters of a mile eastward of Tanjong Masiwang and a 2½-fathom (5^m0) patch lies about one mile east-south-eastward of the same point. Foul ground lies within 2 miles of the coast between this point and Tanjong Danama, and it should not
30 be approached in a depth of less than 16 fathoms (29^m3). Akat, a low but conspicuous islet, covered with coconut trees, and fringed by a reef, lies about 1½ miles offshore and 3½ miles northward of Tanjong Danama. A 19-foot (5^m8) patch lies about 3½ cables east-south-eastward of this islet. Except southward of Akat, this coast is prac-
35 tically inaccessible owing to the off-lying reefs.

- Small vessels with local knowledge can obtain anchorage, in depths of from 3½ to 5 fathoms (6^m9 to 9^m1), off the pier, which has a depth of 8 feet (2^m4) at its head, at Air Kasar village, about 2½ miles north-north-westward of Tanjong Danama (*Lat. 3° 35' S., Long. 130° 53' E.*).
40 The channel leading to the pier lies between drying reefs, which are marked by unofficial beacons. Larger vessels may obtain anchorage, in a depth of 15 fathoms (27^m4), south-eastward of Akat. There are conspicuous mosques at Angloe village, about 1½ miles north-westward of the pier at Air Kasar, and near Kilbad and Kilmoei villages, on the
45 coast about 6 and 8 cables, respectively, south-eastward of the pier.

A detached 13-foot (4^m0) patch lies nearly half a mile offshore, about one mile southward of Tanjong Danama.

- Between Tanjong Danama and Tanjong Kopeng Watoe, 12½ miles southward, the coast is low, bordered with mangroves, and
50 interspersed with coconut plantations, but rises close within to mountainous land. A conspicuous peak, 1,691 feet (515^m4) high, lies 3 miles west-south-westward of Tanjong Danama. Selagor, 2,600 feet (792^m5) high, situated about 5 miles north-north-westward of Tanjong Kopeng Watoe, is conspicuous from eastward, from which direction it has the

Chart 3242.

form of a cheese cover, with the highest part in the middle. The peaks farther southward are described on page 132.

Coast.—Between Kilgah village, $2\frac{1}{2}$ miles southward of Tanjong Danama, and Tanjong Kopeng Watoe, there is no coastal reef, and in places there is a sloping sandy beach, on which, in favourable circumstances, landing can be effected. At Kilgah village, a spur of the coastal reef, which dries 8 feet (2^m4) at its extremity, extends south-westward, and affords shelter to praus.

The coast between Tanjong Kopeng Watoe, the only rocky point on this coast, and the south-eastern extremity of Ceram, is uniformly bordered with mangroves. The latter point is the termination of a low and marshy peninsula, intersected by creeks, and fringed by a drying reef. Some detached patches, with depths of from 2 to 13 feet (0^m6 to 4^m0), lie within half a mile of the coast about midway between these two points.

There are no good anchorages on this stretch of coast, but a vessel with local knowledge could obtain a temporary anchorage in the bight off Arnanan village, 3 miles southward of Tanjong Kopeng Watoe, sheltered in both monsoons, and out of the influence of the tidal stream.

Off-lying islet.—Madorang is a low islet covered with trees, lying on the south-western side of a drying reef, which is steep-to, about 11 miles east-south-eastward of Tanjong Danama.

For Ceram Rei and the islands eastward of it, *see* page 144, and for the southern coast of Ceram, westward of Ceram Rei, *see* pages 132-133.

Charts 3241, 3242.

SOUTHERN SIDE OF CERAM.—Piroe baai.—Dangers.—Beacons.—Piroe baai lies eastward of Schiereiland Hoalmoal, and is fronted by Eiland Ambon. A ridge of mountains, of which Sahoeai, 3,472 feet (1058^m2) high, situated about 22 miles north-north-eastward of Tanjong Sial, the southern extremity, is the summit, extends through the entire length of the peninsula; this mountain, like the other peaks, is only moderately conspicuous. The eastern side of the peninsula northward of Tanjong Aipoetih (Aiputih), about 16 miles north-north-eastward of Tanjong Sial, is not so steep as the western side. Tanjong Batoe Kapal, about $2\frac{1}{2}$ miles south-westward of Tanjong Aipoetih, can be identified by an isolated rock lying close off it.

Kasa, a low flat islet, covered with vegetation, lies about $5\frac{1}{2}$ miles north-eastward of Tanjong Aipoetih. An extensive reef, marked by discoloration, which dries only at the lowest water level, lies between Kasa and Babi; and is marked on its edge by unofficial beacons.

The narrower part of the bay, northward of Babi (*Lat.* $3^{\circ} 13' S.$, *Long.* $128^{\circ} 10' E.$), an islet, 427 feet (130^m1) high, on the eastern side of the entrance of this part, is backed by moderately high mountains, especially on the eastern side, on which there are some conspicuous peaks for a vessel approaching from southward, the most noticeable being Hoehoela (Huhula), 2,107 feet (642^m2) high, the highest peak, which is thickly covered with vegetation, about $3\frac{1}{2}$ miles north-north-eastward of Babi; Henhoehoei, 1,054 feet (321^m2) high, and a peak, 989 feet (301^m4) high, about half a mile west-south-westward of it, about $1\frac{1}{2}$ miles north-north-eastward of Babi. From southward, the two latter peaks have a regular cone-shaped appearance, and like the

Charts 942a, 2759a, 1263.

Charts 3241, 3242.

hills southward of them, have little growth on them. Maroeing, with a double peak, 1,408 feet (429^m1) high, on the western side of the bay, about 8 miles north-westward of Babi, is similar in appearance to
 5 Henhoehoei and the peak west-south-westward of it. Sahoeai, the summit of Schiereiland Hoalmoal, has been described on page 127.

Tanjong Moeroea and Tanjong Tapan, about one and 2 miles, respectively, north-north-westward of the northern extremity of Babi, are steep-to. Tanjong Sisi, about 1½ miles northward of Tanjong
 10 Tapan, is fringed by a reef. Tanjong Toetoenaten, about 1½ miles north-north-eastward of Tanjong Sisi, is covered with trees, and is rendered conspicuous by a hill, 401 feet (122^m2) high, about half a mile within it, which is connected to Hoehoela by a ridge. These points are from about 200 to 500 feet (61^m0 to 152^m4) high. The eastern shore
 15 of the bay northward of them, contrary to the western shore of the inner part of the bay, is bordered by a wide plain, which becomes narrower as it extends northward until westward of Piroe.

An 8-foot (2^m4) patch lies about 2½ miles north-westward of the south-western extremity of Babi. Tetoe is a reef, which dries and is
 20 marked by discoloration, lies close northward of this patch; it is marked by two beacons, each surmounted by a black ball. Sasadaoe, a reef, which dries, lies about 2½ miles west-north-westward of Tanjong Tapan; it is marked on its southern side by an iron beacon, surmounted by a white ball. A 3-fathom (5^m5) patch, marked by dis-
 25 coloration, lies close off Tanjong Teroea, about 1½ miles east-north-eastward of Tanjong Toetoenaten.

Tidal streams.—The stream sets in the same direction on both sides of Kasa, but this is probably not a tidal stream, but is one which enters the bay on one side and out on the other, the direction being
 30 dependent on the wind. During the survey, in the month of February, there was a continual stream setting out of the bay, at a rate of nearly one knot, with a constant north-westerly wind, which at times increased suddenly to a force of 6. In Reede Piroe (*see* below) during the survey, in the first half of February, there was a constant southerly set with
 35 a maximum rate of half a knot.

Chart 3241.

Anchorage.—**Directions.**—Anchorage may be obtained off Loehoe (Luhu) village, 3 miles west-south-westward of Tanjong Batoe Kapal (*Lat.* 3° 22' S., *Long.* 128° 01' E.), in a depth of about 22 fathoms
 40 (40^m2), sand, outside a detached reef, with the mosque bearing 250°. This mosque can be distinguished from the mosque in Iha village, close southward of it, as the former has a dome-shaped zinc roof, and the latter a conical roof.

Charts 3241, 3242.

Anchorage may be obtained by small vessels with local knowledge, in Reede Loki, 3 miles northward of Tanjong Aipoetih, in a depth of about 13 fathoms (23^m8). The anchorage is situated in an opening in the drying coastal reef southward of Loki village, which can be identified by a church standing on the beach. In the middle of the opening there
 50 is a reef which is marked by an unofficial beacon, surmounted by a rectangle. Vessels should pass northward of this beacon on entering.

Reede Piroe.—**Dangers.**—**Beacons.**—This roadstead is situated off the village of the same name at the head of Piroe baai. The limits of the roadstead are the parallel of 3° 05' S., and the meridian of
 55 128° 11' E.

Charts 942a, 2759a, 1263.

Charts 3241, 3242.

A reef, which dries, situated about $8\frac{1}{2}$ cables south-south-westward of the head of the pier at Piroe, is marked on its western side by an unofficial beacon. A 5-fathom (9^m1) patch lies about 2 cables west-north-westward of the reef. The approach to the pier lies between two reefs which extend from the shore on either side of it, and which are marked by unofficial beacons. 5

There are two small sheds on the head of the pier, alongside which there is a depth of 10 feet (3^m0).

A vessel approaching the roadstead should pass westward of the outer beacon and the 5-fathom (9^m1) patch, and thence steer for the western side of the head of the pier, which is conspicuous, bearing 033° , and anchor, in a depth of about 16 fathoms (29^m3), abreast the southernmost beacon, surmounted by a white ball, situated on the eastern edge of the coastal reef, about $3\frac{1}{2}$ cables south-south-westward of the pier-head. 10

Piroe is the headquarters of a Government official. There is a medical officer here.

Chart 3242.

Coast.—On the northern side of the bight between Tanjong Hatoeroesoën, a steep rocky point, situated nearly a mile east-south-eastward of the south-eastern extremity of Babi, and Tanjong Toetoealmatwai (Tutualmatwai), a low point covered with high trees, about 7 miles farther east-south-eastward, is the high land southward of Hoehoela; this coast is indented by several inlets, off which are some drying reefs. Fronting Telok Latal, the westernmost of these inlets, there is a detached drying reef, the south-western extremity of which is separated from the detached drying reef lying southward of Babi (page 127) by a patch which dries, about 5 feet (1^m5) and on which there is a small conspicuous tree. 20 30

The eastern shore of Piroe baai, from Tanjong Aroe, situated about 5 miles east-north-eastward of Tanjong Hatoeroesoën, to Tanjong Hatoemeten, about $12\frac{1}{4}$ miles south-south-eastward, is low and steep-to. About 5 miles east-north-eastward of Tanjong Toetoealmatwai (*Lat.* $3^\circ 16' S.$, *Long.* $128^\circ 18' E.$) there is a mountain, 1,349 feet (411^m2) high, with a conspicuous round-topped tree on its summit. 35

Temporary anchorage may be obtained close off this shore in a few places. The principal villages, although small, are Waisamoe, Hatoesoea (Hatusua) and Kairatoe, the positions of which may best be seen on the chart. 40

Straat Ceram.—Straat Ceram (Serang strait), separating Haroekoe and Saparoea, islands of the Ambon group (page 133), from the southern side of Ceram, is clear of dangers in the fairway. There is usually a moderate west-going stream in the strait. On the northern side the mountains lie close to the coast, the most conspicuous being Toplana, 4,414 feet (1345^m4) high, and the conical Totaniwel, 4,132 feet (1259^m5) high, about one mile south-eastward, situated about $7\frac{1}{4}$ miles eastward of Tanjong Hatoemeten. The narrow coastal strip and the points are low. 45 50

The only anchorage outside the influence of the stream is in Baai van Toehaha (Tuhaha), on the northern side of Saparoea (*see* page 138). Anchorage may be obtained off the Ceram coast, off the villages of Seroeawan, about 3 miles south-south-eastward of Tanjong Hatoe-

Chart 3242.

meten, Tihoeleale and Roemakai, about 7 and 8 miles, respectively, farther eastward, but the bottom is steep, and off the latter village there is a reef with a depth of 3 feet (0^m9).

- 5 **Elpapoetih baai.**—This bay, entered between Tanjong Latoe, a low point situated on the northern side of the eastern entrance of Straat Ceram, and Tanjong Koeako (Kuako), about 14 miles east-north-eastward, is backed by mountainous land, which, on the western side, approaches the coast. Tanjong Koeako is the termination of a low tongue of land, covered with reeds, which is inconspicuous from westward, but about 2 miles south-south-eastward of it is Tanjong Ailoesiha, a steep-to point, with a high clump of trees on it, which is conspicuous.

- On the western side of the bay, about 9 miles north-north-eastward 15 of Tanjong Latoe, and about three-quarters of a mile inland, is Pohon Batoe, 1,254 feet (382^m2) high, with a wide ridge, on the south-western side of which is a small conspicuous tree. The only other noticeable summit farther northward is Hatoe Mani, a table mountain, 2,137 feet (651^m4) high, about 6½ miles northward of Pohon Batoe. The head of 20 the bay and the eastern side are bordered by a wide alluvial plain, covered with bamboo. On the eastern side, about 2 and 5 miles, respectively, eastward of Tanjong Koeako, are Kerai, 510 feet (155^m4) high, and Wele, 1,543 feet (470^m3) high, which can be identified on approaching from south-eastward.

- 25 There are a number of villages on the shores of the bay. Near Waija, on the northern shore, there is a conspicuous shed with a zinc roof.

There are hot springs at many places around the bay; earth tremors frequently occur.

- 30 Anchorage may be obtained in Telok Meroeroe (Meruru), close north-westward of Tanjong Latoe, off Makariki and Hoeroeroe villages, and in Baai van Amahai, on the eastern shore. During the North-west monsoon landing can usually be effected everywhere by praus.

Chart 930, plan of Amahai bay.

- 35 **Baai van Amahai.**—**Dangers.**—**Beacons.**—**Light.**—This bay is entered between Tanjong Koeako and Tanjong Oemepoetih (Umeputih), about one mile north-eastward. The limit of the roadstead is the parallel of Tanjong Koeako (*Lat.* 3° 20' S., *Long.* 128° 55' E.).

- 40 A reef, with depths of less than one fathom (1^m8), extends about half a mile from the eastern side of the bay, and is marked on its edge by three black beacons. A safe anchorage may be obtained between this reef and the western shore, in depths of from 6 to 16 fathoms (11^m0 to 29^m3); during the North-west monsoon there are at times heavy 45 squalls from northward in the afternoon, otherwise a vessel lies quietly here.

Amahai village, at which there is a pier, with a depth of 8 feet (2^m4) alongside, stands at the head of the bay, and there is a conspicuous flagstaff close southward of the pier.

- 50 A light is occasionally exhibited, at an elevation of 10 feet (3^m0), from the head of the pier.

Amahai is the headquarters of a Government official, whose residence is near the flagstaff.

Rainfall.—See page 25.

Charts 942a, b, 2759a, 1263.

Chart 3242.

Coast.—About $2\frac{3}{4}$ miles eastward of Tanjong Ailoesiha, is Roeta (Ruta) village, which is not visible from seaward, but close eastward of it there is a coconut plantation. About 6 miles east-north-eastward of Roeta, there is a hill, 660 feet (201^m2) high, on which there is a conspicuous tree. There is a conspicuous mosque at Sepa village, on the coast 8 miles eastward of Roeta. 5

Between Tanjong Ailoesiha and Tanjong Seitoe, the low western entrance point of Taloeti baai, about 39 miles eastward, the land increases in height towards the latter point. As far eastward as 10
Tamilaoe village, 6 miles east-south-eastward of Sepa, the coast is clear of dangers, thence to Tanjong Seitoe there are a number of sandbanks which nearly dry, including Haoemoea (Haumua), close offshore, and Pekelo, about $1\frac{1}{2}$ miles offshore, situated about 15 and 21 miles eastward of Tamilau. 15

Taloeti (Taluti) baai, entered between Tanjong Seitoe and Tanjong Mataia, about 25 miles eastward, is backed by mountainous land. Waja (Way), 2,590 feet (789^m4) high, is the highest part of the tongue of land which forms the western side of the bay. On the northern side is the Manoesela gebergte (Manusela mountains), 6,796 feet (2071^m4) 20
high, which forms the eastern spur of Binaija, 10,021 feet (3054^m4) high, the highest part of Ceram. The numerous lower peaks, northward of the eastern part of Taloeti baai, are difficult to distinguish from each other. Balimaklam, $14\frac{1}{2}$ miles north-north-eastward of Tanjong Mataia, is, however, conspicuous as a conical peak on a ridge of 25
mountains. See also page 124.

The northern and eastern sides of Taloeti baai are fringed by a narrow reef, which widens somewhat at the mouth of the Wai Bobot, about 2 miles northward of Tanjong Mataia.

Anchorage may be obtained close offshore in several places, but 30
during the South-east monsoon the coast is inaccessible except in Reede Tehoroe.

Chart 911, plan of Tehoru road.

Reede Tehoroe.—**Light.**—This roadstead is situated on the western side of Taloeti baai, about $4\frac{1}{2}$ miles north-north-westward of 35
Tanjong Seitoe. There is a pier, from the head of which a light is occasionally exhibited, at an elevation of 17 feet (5^m2). There are depths of from 16 to 20 feet (4^m9 to 6^m1) at the head of the pier.

Anchorage may be obtained, in a depth of 11 fathoms (20^m1), sand and mud, with the flagstaff, which stands close to the root of the pier, 40
bearing 140° , distant about $1\frac{1}{2}$ cables. A vessel can also anchor about one cable offshore, with a stern hawser to the shore, with the mosque in the village bearing about 135° .

Chart 3242.

Coast.—Between Tanjong Mataia (Lat. $3^\circ 25' S.$, Long. $129^\circ 58' E.$) 45



Remarkable
hill.

Oson, bearing 328° , 26 miles.

(Original dated 1922.)

Charts 942b, 2759a, 1263.

Chart 3242.

and Tanjong Oendoer (Undur), about 44 miles south-eastward, the only conspicuous mountains are Watoe Loes (Watu Lus), 1,658 feet (505^m4) high, and sugar-loaf shaped, about 19 miles east-south-eastward of Tanjong Mataia, and Oson, 2,796 feet (852^m2) high, with a double peak, about 2½ miles north-north-eastward of Watoe Loes.

A reef, with a depth of 10 feet (3^m0), lies about half a mile offshore and 1½ miles south-eastward of Tanjong Kisi, situated about 12 miles south-eastward of Tanjong Mataia; and a reef, with a depth of 6 feet (1^m8), lies about half a mile offshore about 3¼ miles east-south-eastward of the same point.

Chart 911, plan of Kisa Laut road.

Good anchorage may be obtained in Reede Kisalaoet (Kisa Laut road), in a depth of about 9 fathoms (16^m5), sand, off Kisalaoet village, close northward of Tanjong Kisalaoet, about 12½ miles south-eastward of Tanjong Kisi. Tanjong Kisalaoet is fringed by a reef about half a cable wide.

Chart 3242.

Anchorage may be obtained by vessels with local knowledge, in depths of from 5½ to 11 fathoms (10^m1 to 20^m1), mud, in Reede Kilmoeri, about 2 miles north-westward of Tanjong Kilmoeri (Kilmuri), about 10 miles south-eastward of Tanjong Kisalaoet, between the coast and some reefs, with depths of from 5 to 13 feet (1^m5 to 4^m0), lying about one mile off Selor village.

Anchorage may be obtained by vessels with local knowledge, in depths of from 11 to 27 fathoms (20^m1 to 49^m4), off Oendoer village, close northward of Tanjong Oendoer, within the detached 23-foot (7^m0) reef about 1½ miles north-westward of Tanjong Oendoer. About 1½ miles farther north-westward there is a 13-foot (4^m0) patch lying one mile offshore.

Between Tanjong Oendoer and Tanjong Aran, about 9½ miles south-eastward, the coast is fringed by a drying reef, and detached shoals lie within 1½ miles of the coast, the positions of which may best be seen on the chart. Gofa, a low islet, covered with coconut trees, lies about one mile offshore and 2 miles west-south-westward of Tanjong Aran.

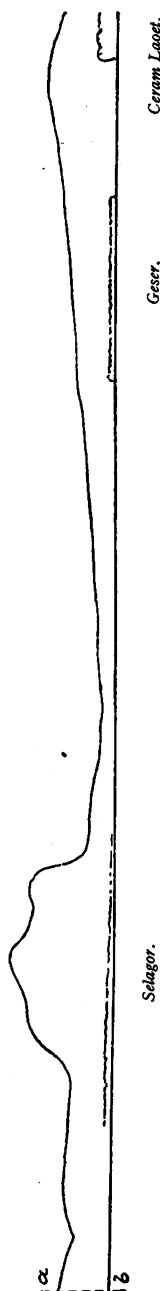
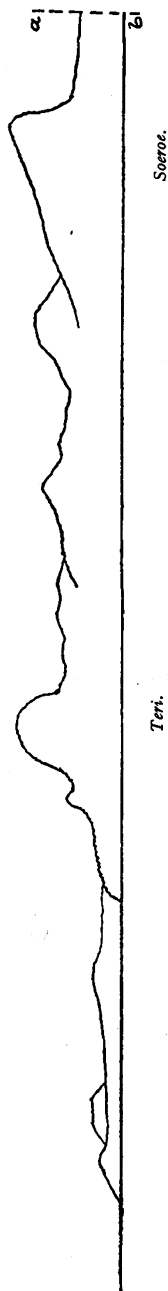
Eastward of Tanjong Oendoer there are several conspicuous peaks. Teri, 2,370 feet (722^m3) high, about 3 miles north-westward of Tanjong Aran, can be identified from a great distance, owing to its steep dome shape with partly barren sides; it is the highest and westernmost of the fantastic mountainous land which occupies the south-eastern extremity of Ceram. (See view facing this page.) Approaching from westward this peak appears as a flat summit, and proceeding eastward the eastern side appears to be the highest. Soeroe (Suru), about 3½ miles east-north-eastward of Teri, is very steep on its northern side, but its western side slopes. Toenlean (*Lat 3° 47' S., Long. 130° 46' E.*), 2,258 feet (688^m3) high, lies about one mile south-south-westward of Soeroe; both these mountains are conspicuous, and except Teri, are covered with vegetation.

There are many villages on the coast, which are situated amongst extensive coconut plantations.

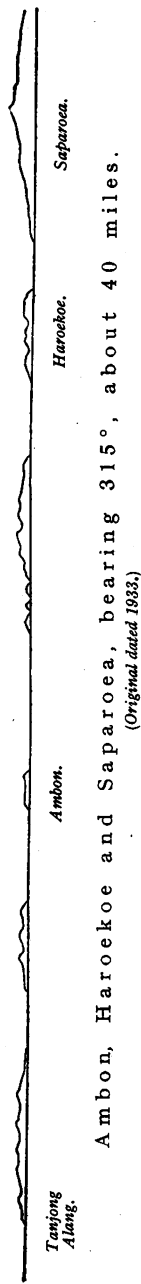
During the West monsoon anchorage may be obtained in most places, the reefs, which are marked by discoloration, can be seen from a short distance.

No tidal stream has been observed close offshore. Farther offshore

To face page 132.



View, in two parts, of the south-eastern extremity of Ceram.
(Original dated 1833.)



Ambon, Haroeke and Saparoea, bearing 315°, about 40 miles.
(Original dated 1833.)



↑
Tanjong, Noesanive,
bearing 281°, 7 miles.

South-eastern side of Ambon from eastward.

(Original dated 1933.)



Ela. Hala. Lain.

↑
Tanjong Tanjong Noesanive,
Alang. bearing 087°, 21 miles.

South-western side of Ambon from westward.

(Original dated 1933.)



Saparoea, bearing 000°.

(Original dated 1933.)

Chart 3242.

the set due to the monsoon appears to be weaker than it is in the Banda sea.

Anchorage may be obtained by vessels with local knowledge, in a depth of 11 fathoms (20^m1), eastward of Gofa. A vessel should approach the anchorage with Teri bearing 354°. Small vessels can anchor farther eastward, between Tanjong Aran and the 23-foot (7^m0) patch about one mile southward, where there is some shelter during the South-east monsoon.

Goeli Goeli village, on a point about 1½ miles south-eastward of 10 Tanjong Aran, can be reached by praus through a channel in the drying coastal reef running north and south.

Charts 3241, 3242.

AMBON AND THE OELIASERS.—Ambon (Amboina), and the three islands Haroekoe (Haruku), Saparoea, and Noesa Laoet (Nusa 15 Laut), known as the Oeliasers, lie southward of the western end of Ceram, being separated from it by Straat Ceram (page 129). They are inhabited by Christians. These islands are mountainous and earthquakes occur, although no volcanic eruptions have been known; the most recent earthquake occurred in 1898, when there was great 20 devastation in Ambon. See view facing page 132.

During the North-west monsoon sudden squalls are frequent; they also occur during the South-east monsoon, but are not so strong.

Ambon.—This island is divided into two parts by Baai van Ambon, the north-western part being Schiereiland Hitoe (Hitu peninsula) and 25 the south-eastern, Schiereiland Laitimor. The highest and most conspicuous mountain is Salahoetoe, 3,475 feet (1059^m2) high, from which several spurs radiate, the most conspicuous of which is Setan, 2 miles north-westward, which appears conical from west-south-westward and the opposite direction, but is an excellent landmark, especially from 30 northward. At the south-eastern extremity of the peninsula are three conspicuous flat-topped limestone mountains, of which Hoewe, 1,205 feet (367^m3) high, is the highest. In the western half of this peninsula there are many scattered peaks, but they are difficult to 35 identify.

Charts 930, plan of Amboina bay, 3241, 3242.

Laitimor is highest on its south-eastern side, where Horiel attains an elevation of 1,904 feet (580^m3), its upper part is moderately flat with a small conspicuous wood on it. Sirimau, 1,596 feet (486^m5) high, about one mile westward of Horiel, is a conical hill with a flat top. 40 Soewal, 1,192 feet (363^m3) high, with a wood on its summit, situated 4 miles north-eastward of Tanjong Noesanive (Nusanive), the south-western extremity of Laitimor, can be easily identified from westward and eastward.

Chart 3241.

Western and northern sides of Ambon.—The western coast is in general more rocky than the northern coast, but both coasts are steep-to. Between Tanjong Alang (*Lat.* 3° 47' S., *Long.* 128° 00' E.), about 6 miles westward of Tanjong Noesanive, and Tanjong Wairole, about 7½ miles north-westward, there is anchorage close offshore, in 50 a depth of about 38 fathoms (69^m5), but strong tidal streams may be experienced, and there is no shelter in either monsoon. See views facing this page.

Charts 942a, 2759a, 1263.

Chart 3241.

Noesa Teloe (Nusa Telu), consisting of the high islets Lain, Hatala, and Ela, the last-named being 297 feet (90^m5) high, lie off Tanjong Wairole, and are good marks. They are separated from each other and
 5 from the coast by clear channels, but owing to the stream, which is sometimes strong, and the narrowness of the channels, they should not be used.

The northern coast, which is fringed by a narrow drying reef in places, affords more opportunity for anchoring, although steep-to, and
 10 there may be a strong stream. A safe anchorage over a bottom of sand and stones may be obtained during both monsoons, close off Said village, situated 8½ miles north-eastward of Tanjong Wairole. The coastal reef eastward of Said village is mostly marked by discoloration. There is a mosque in Hitoe Lama village, about 5½ miles eastward of
 15 Tanjong Hila, and also in Liang village, on the northern coast.

Wai Loi, the largest river in Ambon, flows out about 3½ miles eastward of Tanjong Hoeloeng; at high water it is about half a cable wide at its mouth.

Chart 930, plan of Amboina bay.

20 **Baai van Ambon.—Light.**—Baai van Ambon (Amboina bay), entered between Tanjong Noesanive and Tanjong Alang, both of which are steep-to, has considerable depths, and is sheltered from both monsoons. Both shores are steep-to.

A light is exhibited, at an elevation of 453 feet (138^m1), from a white
 25 iron framework structure, 69 feet (21^m0) in height, on Tanjong Noesanive.

At the head of the bay there is an inner harbour approached through a narrow channel, with a least depth of 6 fathoms (11^m0).

Chart 930, plan of Amboina road.

30 **Reede Ambon.—Light.**—This roadstead, situated off Ambon town, on the south-eastern side of Baai van Ambon, about 7½ miles north-eastward of Tanjong Noesanive, affords anchorage for vessels not exceeding 245 feet (74^m7) in length, in a depth of about 25 fathoms (45^m7), with the boat pier situated abreast Fort Nieuw Victoria,
 35 bearing 090°.

The limits of the roadstead are an imaginary line drawn in a 236° direction from Tanjong Batoe Merah, about three-quarters of a mile north-eastward of Fort Nieuw Victoria, and the meridian of 128° 09' 35" E.

40 There is a concrete wharf abreast the town, with a quay, 312 feet (95^m1) in length and a depth of 33 feet (10^m1) alongside. The boat pier, about 4 cables north-eastward, has a depth of 5 feet (1^m5) at its head.

A light is exhibited, at an elevation of 23 feet (7^m0), from an iron column, 26 feet (7^m9) in height, on the head of the boat pier.

45 The coaling wharf, about three-quarters of a mile south-westward of the concrete wharf, is 275 feet (83^m8) in length, and has a least depth of 23 feet (7^m0) at its western end. Vessels lie alongside quietly even when there is a considerable sea and swell in the bay.

Charts 930, plan of Amboina bay, 3241, 3242.

50 **Tidal streams.**—During the North-west monsoon there is usually a moderate westerly set off Tanjong Alang (Lat. 3° 47' S., Long. 128° 00' E.), which follows the coast and trends northward. There are sometimes eddies off Tanjong Noesanive. A strong stream may set along the south-east coast of Laitimor.

Charts 942a, 2759a, 1263.

Charts 930, plan of Amboina bay, 3241, 3242.

In the roadstead the streams set about north-east and south-west, the direction and rate, which seldom exceeds one knot, being dependent on the wind. There is sometimes an eddy off the piers, so that the direction of the stream in the roadstead is not always an indication of what to expect when proceeding alongside. 5

Directions.—A vessel approaching Baai van Ambon in the rainy season, when the visibility is so much reduced, will find it difficult to identify its features. If approaching from westward the high land in the vicinity of Tanjong Alang will first be distinguished. Coming 10 from southward or just eastward of the meridian of Tanjong Noesanive, the light-green hill Kapal, 779 feet (237^m4) high, situated about 1½ miles north-eastward of this point, will appear as an islet in front of the high land within the north-western shore of the bay.

It is recommended to approach the anchorage with the anchor 15 lowered with from 25 to 30 fathoms (45^m7 to 54^m9) of cable out.

Chart 930, plan of Amboina road.

Ambon.—Ambon (Amboina), the capital of the Residency of the same name, is the headquarters of the Government officials. The Resident's house is situated in the Batoe Gadjah (Batu Gajah) quarter, 20 south-eastward of the town.

A conspicuous mosque, with a cupola, stands about 2½ cables south-eastward of the concrete wharf, and there is another conspicuous mosque in Batoe Merah village, about one mile north-eastward.

Harbour facilities.—Fresh provisions may be obtained. Water is 25 laid on to the concrete wharf and coaling wharf.

A large amount of coal is kept in stock, and a small quantity of fuel oil.

A medical officer resides in the town, in which there is a hospital.

W/T station.—There is a W/T station. *See* page 10. 30

Trade.—The principal exports are cloves, nutmegs, mace and copra; the chief imports are cloth, ironware, canned provisions and timber.

Meteorological table.—*See* page 24.

Chart 3242.

South-eastern side of Ambon.—During the South-east monsoon this coast is almost inaccessible. Baai van Seri, entered between Tanjong Hatiari (*Lat.* 3° 46' S., *Long.* 128° 09' E.), 4 miles north-eastward of Tanjong Noesanive, and Tanjong Seri, about 1½ miles north-north-eastward of Tanjong Hatiari, affords anchorage to vessels 40 with local knowledge, in depths of from 15 to 16 feet (4^m6 to 4^m9), on the detached bank which runs parallel to the shore northward of Tanjong Hatiari; the channel between this bank and the shore is only accessible from northward.

Tanjong Riki, about 6½ miles north-eastward of Tanjong Seri, is 45 rendered conspicuous by some bare rocks. At Laehari village, close north-westward of Tanjong Riki, the trees stand as far as 2 cables out in the sea at high water, but the village is not visible from seaward. In the bight entered between Tanjong Riki and Tanjong Hoetoemoeri (Hutumuri), about 1½ miles north-eastward, there are a few villages. 50 There is a conspicuous house with a light-coloured roof in Hoetoemoeri village, on the northern shore of this bight.

Baai van Bagoeala is entered between Tanjong Hoetoemoeri and Tanjong Meriam, about 5 miles north-eastward; it is shallow at its head. 55

Charts 942a, 2759a, 1263.

Chart 3242.

A shoal, with a rock near its centre with a depth of less than 6 feet (1^m8) over it, lies in the middle of the entrance to the bay. A shoal, with a depth of 4 fathoms (7^m3) over it, lies about 2 miles westward of 5 Tanjong Meriam and half a mile offshore. A detached 2-fathom (3^m7) patch lies off the south-eastern extremity of the shore bank at the head of the bay, about 3 cables off the south-western shore.

Straat Haroekoe.—Anchorages.—Straat Haroekoe (Haruku strait), between the eastern side of Ambon and Haroekoe, has a least 10 width of about 2½ miles, but the navigable channel is reduced to a width of about 1½ miles at the northern end between a drying reef on which Pombo, a low islet, lies, and a detached reef about 1½ miles east-north-eastward of it. Batu Lompa and Batu Doea, lying close off the western shore, about 2½ and 5½ miles, respectively, northward of 15 Tanjong Meriam, are rocks above water, and are good marks. Batu Kapal, thickly covered with vegetation, lies close off Tanjong Batoe Kapal, the south-western extremity of Haroekoe, and is conspicuous. The trees standing on the mountain, 1,090 feet (332^m2) high, situated about 3½ miles north-north-eastward of Tanjong Batoe Kapal, and the 20 white tower of a mosque in Kailolo village, about 3 miles farther northward, are conspicuous.

The eastern shore is not so clear as the western, especially northward of Tanjong Totoe, where there are some detached dangers.

The only anchorage on the western side of the strait is off Wai 25 (Wai) village, which is easily identified. There are two dark green points in this vicinity, and the village stands south-westward of the south-western one; there is a boat shed on the beach, from which the Netherlands flag is usually displayed on the arrival of a vessel. Anchorage may be obtained, in a depth of about 21 fathoms (38^m4), with the 30 boat shed bearing 263° and Pombo, 058°.

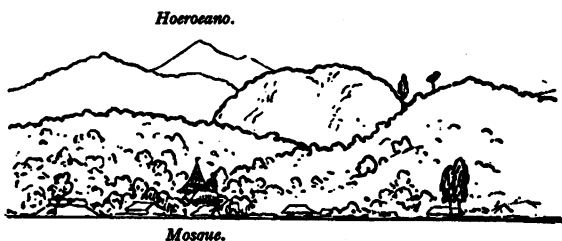
Anchorage may be obtained during both monsoons by vessels with local knowledge, off Haroekoe and Kabaoe villages, on the eastern side of the strait. The anchorage off Haroekoe (*Lat.* 3° 36' S., *Long.* 128° 25' E.) is in a depth of about 27 fathoms (49^m4), with the high, 35 conspicuous roof of the church in it bearing 100°. Off Kabaoe, where three mosques stand close together, a vessel can obtain anchorage off the edge of the detached reef, which fronts the village, in a depth of about 27 fathoms (49^m4), with the southern mosque, which is the least conspicuous, bearing 101°.

40 A vessel proceeding through the strait at night should keep to the western side. The tidal streams set northward and southward, at a maximum rate of 1½ knots. They are strongest off Tanjong Batoe Kapal, where tide-rips occur, and on both sides of Pombo.

Haroekoe.—The summit of this island is Hoeroeano (Huruano), 45 1,970 feet (600^m4) high, which is a good mark from between east and south-east, from which direction it has a rounded shape, but from between north-west and north it appears conical. The central mountain group extends to the south coast, where it terminates steeply on the eastern side of Telok Aboroe, about 6 miles eastward of Tanjong Batoe 50 Kapal. There are two conspicuous conical hills on Tanjong Waisoi Besar, on the southern side of the island. Farther westward the mountainous land extends to a high plateau, which terminates in Tanjong Batoe Itam and Tanjong Batoe Kapal at the south-western extremity of the island.

Chart 3242.

Anchorage may be obtained off all the villages on the coast of Haroekoe. In Telok Aboroe, the best berth is with a house with a white wall in Aboroe village bearing 332° ; this anchorage is unsafe in the South-east monsoon. Off Pelauw village, near the middle of the north coast, there are depths of from 27 to 33 fathoms (49^m4 to 60^m4), outside the influence of the stream, with the mosque in line with Hoeroeano, bearing 159° . 5



Hoeroeano in line with mosque, bearing 159° .

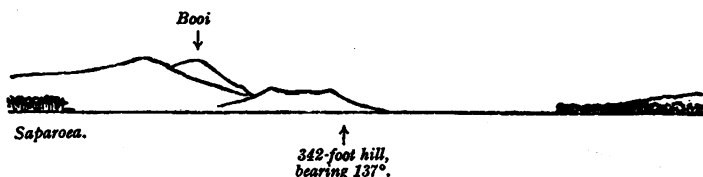
(Original dated 1933.)

Straat Saporoea.—This strait, between Haroekoe and Saporoea, eastward of it, has a least width of half a mile and is clear of dangers in the fairway. The reefs which extend from either side in the narrow part of the strait are usually well marked by discoloration. 10

Molana, an uninhabited island 575 feet (175^m3) high, and steep-to, lies in the southern approach to the strait with its northern extremity about $2\frac{1}{2}$ miles westward of Tanjong Booi (Bui), the southern extremity of Saporoea. 15

A temporary anchorage may be obtained by vessels with local knowledge, in a depth of about 15 fathoms (27^m4), off Hoelalieo village, on the western side of the strait close southward of Tanjong Haloeamoena (Haluamuna), the north-eastern point of Haroekoe. Anchorage may be obtained in Baai van Haria, on the eastern side of the strait at its southern end, but there may be some sea during the North-west monsoon. 20

A vessel approaching the strait from northward should steer for the 342-foot (104^m2) hill, close southward of Tanjong Hatoealane (*Lat.* $25^{\circ} 3' 35''$ S., *Long.* $128^{\circ} 37''$ E), the southern entrance point of Baai van Haria, bearing 137° , taking care to keep in the middle of the strait. Vessels are recommended not to use this passage at night.



Straat Saporoea from north-westward.

(Original dated 1933.)

The tidal streams set north-west and south-east, and may attain a rate of 3 knots. Tide-rips occur north-westward of the narrowest part of the strait. 30

Charts 942a, 2759a, 1263.

Chart 3242.

Saparoea.—This island is mountainous with a conspicuous depression in its narrowest part. Tahoeke, its summit, about midway on the western side, is 1,179 feet (359^m4) high; Booi, 1,061 feet (323^m4) high, close within Tanjong Booi, is very conspicuous. Along the shores of Baai van Toehaha (Tuhaha bay), on the northern side, the land is flat, elsewhere the coast is mostly rocky. See view facing page 133.

There is an extensive detached reef with two drying patches on the western side of Baai van Toehaha; a reef extends about 4 cables from the northern part of the western shore and as much as 2½ cables from the middle of the eastern shore.

Good anchorage may be obtained in Baai van Toehaha, the best berth being southward of Nolot village, situated on Tanjong Nolot, the eastern entrance point of the bay. Farther northward there is inconvenience from the strong stream, which is constantly changing its direction.

On the southern side of Saparoea there is a bay entered between Tanjong Booi and Tanjong Ouw (Auw), about 4½ miles eastward. Close eastward of Tanjong Booi is Pombo, a rocky islet, 47 feet (14^m3) high, covered with vegetation. Tanjong Ouw rises steeply from the sea to an elevation of 162 feet (49^m4). Reefs, which dry, extend from both entrance points, and a strong stream sets along the reefs.

The western side of the bay is steep, with a narrow shore reef. The south-eastern side is also steep, but there is a wide shore reef, with a 17-foot (5^m2) patch lying about half a mile off about 2½ miles north-westward of Tanjong Ouw.

Chart 911, plan of Saparua bay.

Reede Saparoea.—**Light.**—**Beacon.**—This roadstead lies northward of an imaginary line drawn from Tanjong Paperoe, about 2½ miles north-north-eastward of Tanjong Booi, to Tanjong Torano, about 1½ miles east-north-eastward of Tanjong Paperoe.

A reef, with a depth of 1½ fathoms (2^m3), marked on its northern side by a beacon, surmounted by a black truncated cone, lies 6 cables north-westward of Tanjong Paperoe.

Saparoea village is situated at the head of the bay. There is a pier with a depth of about one foot (0^m3) alongside.

A light is exhibited, at an elevation of 17 feet (5^m2), from a wooden post, 16 feet (4^m9) in height, on the head of the pier at Saparoea.

A white monument, on the shore about 3½ cables westward of the pier-head, is a good mark.

The roadstead is calm, except occasionally during the South-east monsoon, when there may be some swell, although not sufficient to prevent communication with the shore. A vessel entering the roadstead should steer for the pier-head, bearing 320°, which will lead clear of the 1½-fathom (2^m3) reef north-westward of Tanjong Paperoe (Lat. 3° 35' S., Long. 128° 40' E.).

Rainfall.—See page 25.

Chart 3242.

Noesa Laoet.—Noesa Laoet (Nusa Laut), situated about 2½ miles south-eastward of the south-eastern extremity of Saparoea, is fringed by a reef, which mostly dries. Lawakano, its conspicuous summit, is 1,113 feet (339^m3) high.

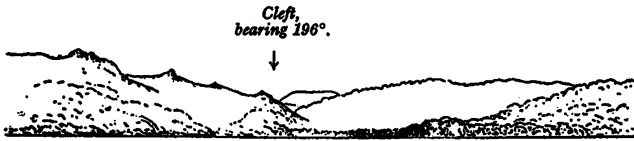
A vessel proceeding through the channel between Saparoea and

Chart 3242.

Noesa Laoet, should give the former a berth of at least $3\frac{1}{4}$ cables, and the latter at least $5\frac{1}{4}$ cables.

Chart 911, plan of Nalahia bay.

Baai van Nalahia, on the northern side of Noesa Laoet, is backed by steep hills and is difficult to identify from seaward. A vessel should approach with a cleft in the hills bearing 196° , and anchor when a depth



Baai van Nalahia from north-north-eastward.

(Original dated 1933.)

of about 36 fathoms (65^m8) is obtained, abreast the point on the western side, about 130 feet (39^m6) high, on which Nalahia village stands. Vessels lie here quietly during both monsoons.

Charts 942a, b, 2759a, 1263.

CHAPTER IV

BANDA AND ARAFURA SEAS

Charts 942a, b.

BANDA SEA.—**Tidal streams.**—Banda sea extends from the south-eastern side of Celebes on the west to New Guinea on the east, and is bounded on the north by Boeroe (Buru) and Ceram, and on
5 the south by the chain of islands extending eastward from Timor.

In the western part of Banda sea, in that portion which lies southward of Banggai archipel and Soela eilanden, the drift stream sets north-north-westward or east-south-eastward. During the southerly monsoon the stream may attain a rate of 2 knots, but it is usually
10 about half a knot; during the northerly monsoon these rates may be 2 knots and three-quarters of a knot, respectively.

Chart 942a.

Outlying danger.—A shoal, the position of which is doubtful, was reported, in 1927, to lie about 36 miles south-westward of the
15 southern extremity of Boeroe. This is the only known danger in Banda sea, except those in the vicinity of the various islands, which are described with those islands.

Lucipara eilanden.—This uninhabited group, situated 108 miles south-south-eastward of the southern extremity of Boeroe, consists
20 of four coral islands, namely, Mai, Laponda, Kaurangka and Selatan, lying on an extensive reef, the edge of which dries and is steep-to. They are covered with vegetation, and the tops of the trees on Mai, the north-westernmost island, are 108 feet (32^m9) high. Landing can be effected on the lee side if the sea is not too heavy.

25 Skaro rif (*Lat. 5° 35' S., Long. 127° 29' E.*), which dries, lies about 6 miles south-westward of Lucipara eilanden; on the reef are two white sandy patches which only cover at the highest half yearly water levels. There is a clear deep channel between the islands and the reef.

Irregular tidal streams and whirlpools have been observed close
30 southward and north-westward of Lucipara eilanden.

Schildpad eilanden.—This uninhabited group, situated about 14 miles north-eastward of Lucipara eilanden, consists of three low coral islands, namely, Mai, Kadola and Bingkoedoe. They are covered with high trees, and lie on detached reefs which dry and are steep-to.
35 The channels between them are deep and clear of dangers.

Chart 3243.

Eiland Manoek.—This island, situated about 150 miles eastward

Charts 2759a, 1263.

To face page 141.

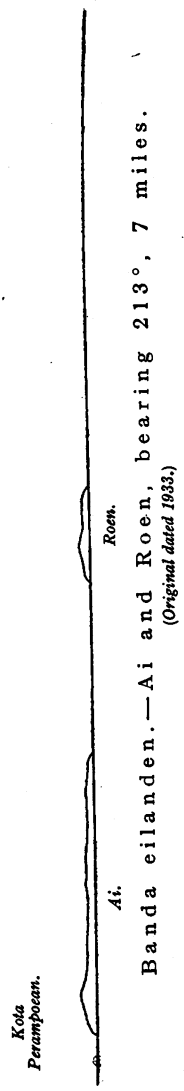
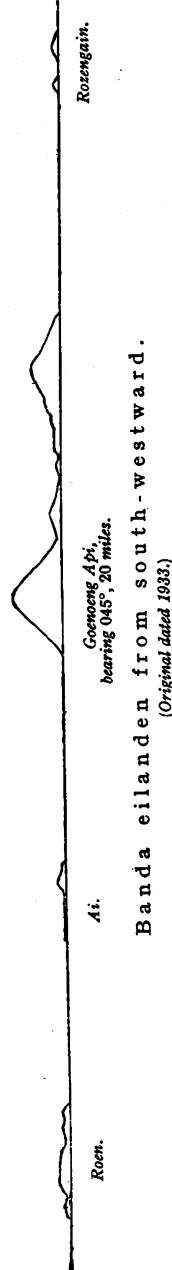
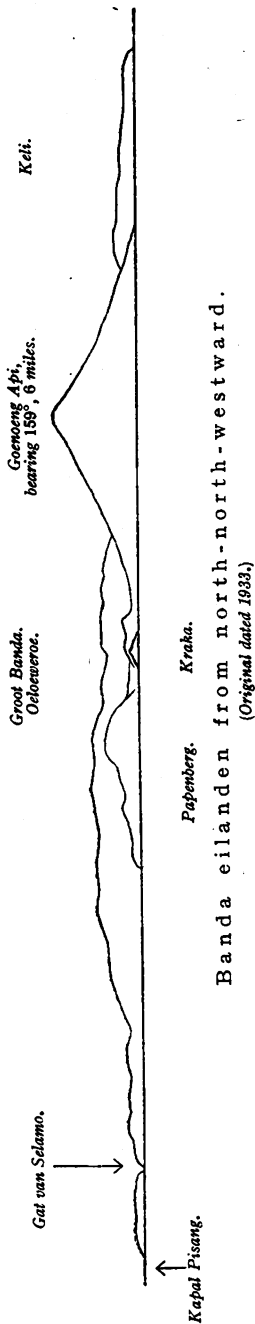


Chart 3243.

of Schildpad eilanden, rises steeply in the form of a truncated cone to an elevation of 932 feet (284^m1); it is volcanic, but no eruptions have been known; the crater, which shows best from the south-south-eastern side, is in the centre of the island. On the western side of the island there is a small sandy beach, behind which the mountain rises vertically. In 1899, dense vapour was seen issuing from the crater wall, and quantities of sulphur were found on the island. The coastal reef which dries, extends about one cable offshore at the north-western extremity and as far southward as the sandy beach.

Anchorage may be obtained in calm weather, in a depth of about 44 fathoms (80^m5), about 1½ cables from the sandy beach.

BANDA EILANDEN.—These islands, situated about 65 miles south-westward of the south-eastern extremity of Ceram, are divided into the main group, comprising Groot Banda, Naira, and Goenoeng Api, and the outer islands, namely, Soeanggi, Roen, Ai and Rozengain. (See views facing this page). The depths around the islands are considerable, and the only off-lying danger is Rif van Rozengain (page 143). Earthquakes frequently occur, and destructive volcanic eruptions have taken place, the latest, in 1852. All the islands, except Soeanggi, are inhabited.

In June and September, the sea for many miles around the islands assumes a whitish appearance as if a thin mist was hanging over the surface, which is attributed to a mass of small animalcules, which float in the water near the surface.

In the narrow channels of the main group the tidal streams are strong; tide-rips occur between the outer islands and the main group, and between Rozengain and Rif van Rozengain they sometimes give the impression of breakers.

Soeanggi.—This island (*Lat. 4° 19' S., Long. 129° 42' E.*), the northernmost of the group, is 348 feet (106^m1) high, with almost vertical bare sides and the summit covered with vegetation. The island is fringed by a drying reef except on its western side.



Soeanggi, bearing 056°, 6 miles.

(Original dated 1933.)

Roen.—This island, the westernmost of the group, is 663 feet (202^m1) high at its southern end, and steep. It is fringed by a reef, which dries, and which extends about three-quarters of a mile north-north-eastward from the northern extremity of the island. Nailaka is a low islet lying on this part of the reef.

The only anchorage is in the bight in the drying reef between Nailaka and Tanjong Lokon, the eastern extremity of the island, in a depth of 38 fathoms (69^m5), but it is only of use in the West monsoon.

Ai.—This island, about 4½ miles east-north-eastward of Roen, is 473 feet (144^m2) high on its eastern side, and is generally steep except on its northern side; the north-eastern and north-western extremities are high. The island is entirely fringed by a drying reef. In the

Chart 3243.

western part of Ai village, on the northern side of the island, there is an old fort.

There is a restricted anchorage for large vessels, in a depth of 5 38 fathoms (69^m5), sand and stones, off the western side of the island, with Tanjong Batoe Pajong, the north-western extremity, bearing 060°, and Tanjong Batoe Oedang, 128°.

Chart 3440, plan of Banda islands.

Groot Banda.—This island has a ridge of hills, covered with 10 vegetation, running through its entire length, of which, Bandera, 1,757 feet (535^m5) high, is the summit. Except at the western end on the northern side of the island, there is little or no fringing reef. Most of the villages are on the northern side. Lontor, near the western end of the island, stands on the slope of an old crater wall.

15 About 6 cables north-north-westward of Tanjong Boerang, the northern extremity of Groot Banda, is Pisang, an islet 213 feet (64^m9) high, on which there is a coconut plantation, and a conspicuous bare rock on its northern extremity. Batu Kapal, a bare islet, lies about 3 cables farther northward. It is unadvisable to attempt the passage 20 between these islets, as the tidal streams are strong, but Gat van Selamo, the passage between Tanjong Boerang and Pisang, is deep and clear of dangers, and a vessel may round the point closely.

Chart 3440, plans of Banda islands, and Naira road.

Naira.—Naira is hilly; Papenberg (*Lat.* 4° 31' S., *Long.* 129° 54' E.), 25 the summit, is 819 feet (249^m6) high. The northern, eastern and southern sides of the island are fringed by a drying reef, which extends as much as 1½ cables offshore in places.

At the northern end of Zonnegat is Kraka, an islet, 84 feet (25^m6) high.

30 Reede Naira comprises two roadsteads, one in the southern part of Zonnegat, between Goenoeng Api and Naira, and the other southward of Naira.

Goenoeng Api is almost entirely occupied by the volcano Vuurberg, 2,150 feet (655^m3) high; its upper part is bare, and vapour issues from 35 the two craters which are on the sides of the summit; sulphurous fumes are also emitted from crevices elsewhere. At the north-eastern extremity of the island is Oeloeweroe, a hill 307 feet (93^m6) high, which has steep sides. Only on the western side of the island is there no drying reef.

40 **Tidal streams.**—Strong tidal streams set through the channels. In the roadstead southward of Naira, the stream sets eastward during the rising tide, and westward with the falling tide, at a maximum rate of 3 knots.

Chart 3400, plan of Naira road.

45 **Anchorage.**—**Directions.**—Good anchorage may be obtained, over sand, coral and stones, in any required depth, southward of Naira.

The depths in Zonnegat are considerable, and squalls are frequent.

A vessel of moderate size bound for the roadstead in Zonnegat, should approach from northward, and may pass on either side of 50 Kraka; if passing south-westward of it she should steer for the village on the western side of Naira, situated about 1½ cables southward of Papenberg, bearing 121° open north-eastward of Pulau Vera, which leads over the bar south-westward of Kraka in a least depth of 6½ fathoms (11^m9); the bank which fringes the northern side of

Chart 3400, plan of Naira road.

Goenoeng Api is mostly marked by discoloration. If passing eastward of Kraka she should keep the eastern side of the Government pier (see below) in line with the eastern side of Pulau Vera, bearing about 163° .

A vessel from westward proceeding through Gat van Lontor, the channel between the southern side of Goenoeng Api and the northern side of the western end of Groot Banda, should keep close to Goenoeng Api until abeam of Verbrande hoek, situated in the middle of the southern side of Goenoeng Api.

Piers.—Light.—There are two piers, which dry alongside, on the southern side of Naira, the western, on which there is a shed, being the better. The eastern is the Residency pier.

A light is occasionally exhibited, at an elevation of 7 feet (2^m1), from a wooden post, at the head of the eastern pier.

The Government pier is situated in Zonnegat, on the south-western side of Naira, and has depths of from 15 to 26 feet (4^m6 to 7^m9) alongside. There is a mooring buoy westward of the pier. Vessels should moor alongside heading northward, with an anchor ahead and a hawser laid out to the mooring buoy.

Naira. The town of Naira stands along the south-western and southern sides of the island of Naira; the western part is occupied by Chinese, and the eastern part by Europeans.

Provisions and water are scarce. There is a medical officer in the town.

Rainfall.—See page 25.

Chart 3243.

Rozengain.—This island lies about 5 miles south-eastward of Groot Banda. Lari, the summit, is 558 feet (170^m1) high, and is covered with vegetation. Kota Batoe Merah, a bare hill, 555 feet (169^m2) high, on the eastern side of the island, is conspicuous; a small wood stands on its western slope near the summit, and is especially conspicuous from southward. The island is fringed by a drying reef marked by discoloration, except on its south-western side. Two rocks, above water, lie one on either side of Tanjong Poeloe (*Lat.* $4^{\circ} 34' S.$, *Long.* $130^{\circ} 02' E.$), the north-eastern extremity of the island. Rozen-gain, the only village, stands near a small sandy beach on the northern side of the island.



Off-lying danger.—Rif van Rozengain, about 2 miles south-south-eastward of Rozengain, dries about 3 feet (0^m9) at its northern end; it is marked by discoloration and breaks heavily.

*Chart 942b.***ISLANDS OFF SOUTH-EASTERN END OF CERAM.**

A ridge, with depths of less than 100 fathoms (182^m9), on which there are a number of islets and drying reefs, extends about 22 miles eastward from the south-eastern extremity of Ceram. Between these reefs there are four channels, leading northward from Banda sea, of which

Charts 2759a, 1263.

Chart 942b.

the two western, Straat Kefing and Straat Kilwaroe are the most important. The easternmost channel is obstructed on its northern side by a barrier of reefs. The edges of the reefs on all sides of this channel are marked by bright discoloration, and there are often heavy breakers on them.

Ceram Laoet and the islets westward are described with Straat Kilwaroe and Straat Kefing. See below.

Marlau, close eastward of the north-eastern extremity of Ceram Laoet, is low and at low water is connected to it. Kifar, 129 feet (39^m3) high, about 2 miles south-eastward of Marlau, and several low islets lying on the drying reefs farther eastward, are all covered with coconut trees. There is a conspicuous tree on a rock situated about 6 cables south-south-westward of Kifar. Some of these islets are inhabited.

Tidal streams.—Tidal streams, attaining a rate of 3 knots at springs, set through the channels mentioned above, and when they are opposed to the wind there is often a rough sea. The stream usually sets northward with the rising tide and southward with the falling tide. At Geser, however, at springs, the south-going stream commences 2 hours after high water, and at neaps about one hour after high water.

Eastward and southward of Koon, an island at the eastern extremity of the ridge mentioned above, the tidal streams are strong and variable, and cause heavy tide-rips in this vicinity and also off the northern end of Gorong eilanden (page 145). In the passage between Koon and Pandjang the stream sets strongly towards the ridge extending eastward from Ceram.

Chart 3440, plan of Kilwaroe and Kefing straits.

30 Straat Kefing.—**Dangers.**—This strait, lying between Ceram Rei (Serang Rei) and Geser, is about 8 cables wide between the drying reefs on either side, and is deep in the fairway.

Ceram Rei (*Lat.* 3° 52' S., *Long.* 130° 51' E.) is a low islet covered with high trees, lying on the north-eastern edge of the drying reef, which extends about 1½ miles south-eastward from the south-eastern extremity of Ceram. It is fringed by a white sandy beach which covers at high water. There are a number of trees on the drying reef between the islet and the coast of Ceram, which, like the islet on this side, is extending.

40 Geser, a flat islet, wooded with high trees, lies on the north-eastern side of a drying reef, about 1½ miles east-south-eastward of Ceram Rei.

Straat Kefing is marked on its eastern side by stakes, each surmounted by a ball, standing on the edge of the reef on which Geser lies. There is a shoal, with a depth of 29 feet (8^m8), on the western side of the southern entrance, about 1½ miles southward of the south-eastern extremity of Ceram Rei, and a shoal, with a depth of 23 feet (7^m0), lies on the eastern side about 9 cables south-westward of the southern extremity of Geser.

Straat Kilwaroe.—**Light.**—**Beacons.**—This strait, between Geser and the western side of Ceram Laoet (Serang Laut), has a least depth of 6 fathoms (11^m0) in the fairway between the reefs on either side. Ceram Laoet is 293 feet (89^m3) high, rocky, and mostly covered with coconut trees. Kilwaroe, about half a mile eastward of the northern end of Geser, is low.

Charts 942b, 2759a, 1263.

Chart 3440, plan of Kilwaroe and Kefing straits.

A light is exhibited, at an elevation of 30 feet (9^m1), from a mast on the pier-head on the north-eastern side of Geser.

The fairway is marked by two iron beacons, each surmounted by a black truncated cone, on the western side, and by two iron beacons, each surmounted by a white ball, on the eastern side. The edge of the reef on either side is also marked by several unofficial beacons, the positions of which may best be seen on the plan.

The direction of the tidal stream is sometimes indicated from the flagstaff on the pier by a red flag, indicating a north-going stream, a white flag, slack water, and a blue flag, a south-going stream.

Reede Geser.—The limits of the roadstead are the parallels of 3° 52' 20" S and 3° 53' 10" S. The pier is situated on the northern side of the entrance to a lagoon. Geser village stands on both sides of the entrance to the lagoon, the two parts being connected by a bridge. The village is the headquarters of a Government official. Forest produce and copra are exported. Provisions, except fish, are very scarce.

There is a small mole, with a shed on it, on the northern side of Geser.

Anchorage.—Directions.—The best berth is about one cable off shore abreast the pier, in a depth of about 10 fathoms (18^m3), pebbles; it is advisable to moor as the anchorage is confined. If the tidal stream is strong and the sea rough, it is advisable to anchor farther northward, north-eastward of the black truncated cone beacon, situated on the edge of the reef about 4 cables north-north-westward of the light structure.

A vessel approaching from southward should steer for the conspicuous summit (chart 942b) of Ceram Laoet, bearing 056°, until the southernmost ball beacon, situated on the edge of the reef extending westward from Ceram Laoet, about one mile south-south-westward of Kilwaroe (*Lat. 3° 53' S., Long. 130° 54' E.*), is nearly in line with the south-eastern extremity of that islet, bearing about 020°, when she should alter course northward and be guided by the beacons to the anchorage.

A vessel approaching from northward should steer for the northern entrance of Straat Kefing until the north-eastern extremity of Geser is in line with the south-western extremity of Ceram Laoet, bearing about 158°, when the beacons will be sighted and the vessel can proceed to the anchorage.

Chart 3243.

Gorong eilanden.—This group consists of Pandjang, Manawoka and Gorong, all thickly covered with vegetation. (See view facing page 146). Pandjang, which lies about 16 miles east-south-eastward of Ceram Laoet, is 326 feet (99^m4) high. The most conspicuous landmark of the group is Lololi, the summit of Manawoka, which attains an elevation of 1,176 feet (358^m5), and appears as a table mountain from south-westward, but from northward or southward appears as a peak. Gorong, which lies about 7½ miles eastward of Pandjang, is 1,051 feet (320^m3) high near the middle. From eastward, a small clump of trees, the top of which has an elevation of 910 feet (277^m3), projects above the remaining thick vegetation.

Each island is fringed by a steep-to coral reef, and there are no off-lying dangers more than one mile offshore. The channels between the islands are deep in the fairway.

Charts 942b, 2759a, 1263.

Chart 3243.

Pandjang is rocky on its southern and south-western sides, but is interspersed with small sandy beaches. For about $1\frac{1}{2}$ miles northward of Wisalen village, on the south-eastern side of the island, the coast is bordered by mangroves, off which clumps of trees stand in many places on the coastal reef. The whole island is densely wooded.

Manawoka lies about 2 miles south-eastward of Pandjang; its coast is alternately low and rocky. There are a few villages on the east coast with large coconut plantations.

- 10 The coast of Gorong is mostly low and there are numerous coconut plantations along it. Tanjong Assan, the north-western extremity, is rocky, and Tanjong Namalèn (chart 942b), the north-eastern extremity, is sandy.

Tidal streams.—The tidal streams in the vicinity of Gorong eilanden set northward with the rising tide and southward with the falling tide. Southward of Manawoka the latter stream sets about south-south-westward at a rate of $2\frac{1}{2}$ knots at springs. There are strong tide-rips in places, especially off the southern ends of the islands.

- Anchorage.**—Anchorage may be obtained, in a depth of $6\frac{1}{2}$ fathoms (11^m9), near, or on the small bank which lies northward of Amar village (*Lat.* $4^{\circ} 05' S.$, *Long.* $131^{\circ} 19' E.$), on the north-eastern side of Manawoka, about 2 miles from the northern end of the island. Vessels, however, do not lie quietly here during the strength of the monsoons, and landing is difficult in the northerly monsoon. The village and flagstaff are not easily identified. Some large rocks, which only cover at very high water, lie on the edge of the drying reef eastward of the flagstaff. There is a channel, which dries, in the reef there, in which praus often lie.

- Anchorage may be obtained by vessels with local knowledge in Reede Ondoer, on the western side of Gorong, about 2 miles southward of Tanjong Assan. There is a channel, marked by unofficial beacons, leading to the anchorage. A reef, with a depth of 13 feet (4^m0), lies on the northern side of the entrance to the channel, about $6\frac{1}{2}$ cables south-westward of the mosque in Ondoer village. Large vessels should anchor, in a depth of 22 fathoms (40^m2), in the outer basin.

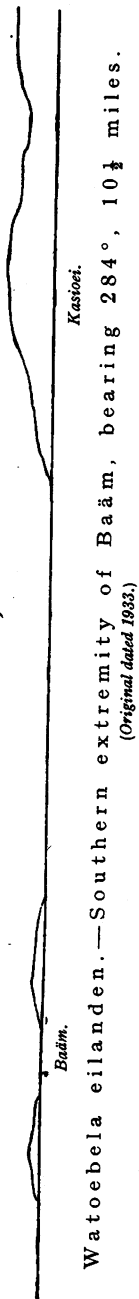
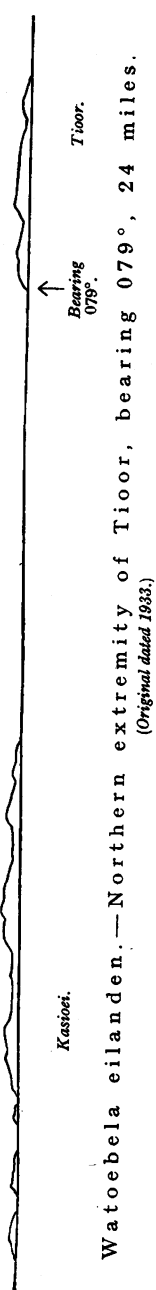
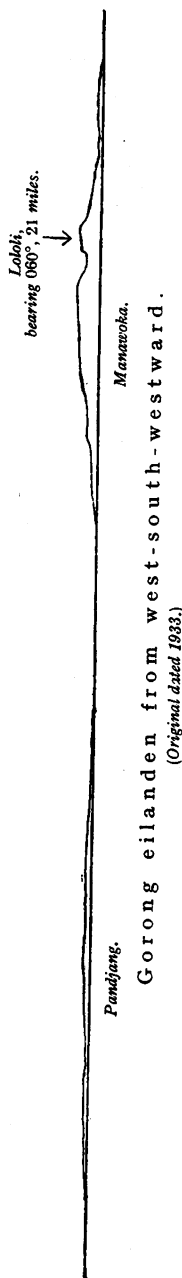
- Anchorage may be obtained by vessels with local knowledge in Reede Kailakat, on the eastern side of Gorong near the southern end. The small bay here can be easily identified by a conspicuous bare red patch close southward of the southern entrance point. A vessel should approach with the white bridge spanning the river mouth, situated southward of the southernmost mosque, bearing 265° . A drying reef extends as much as $2\frac{1}{2}$ cables offshore on both sides of the bay.

- Watoebela eilanden.**—This group, which lies south-south-eastward of Gorong eilanden, consists of the hilly islands Ingar, Watoebela, Kasioei, Koerkap, Baäm, Tioor and Oeran, all of which are thickly covered with vegetation. (See views facing this page and page 147.) The channels between the islands are clear of dangers in the fairway. The inhabitants are friendly. Copra culture and fishing are their principal means of existence, but there is little trade.

- 50 Ingar, about 14 miles south-eastward of Manawoka, is a low island covered with coconut trees, and is bordered by a white beach. The island is uninhabited.

- Watoebela lies $2\frac{1}{2}$ miles south-south-eastward of Ingar. Dadang, its summit, is 702 feet (214^m0) high, and is conspicuous from eastward and westward.

Charts 942b, 2759a, 1263.



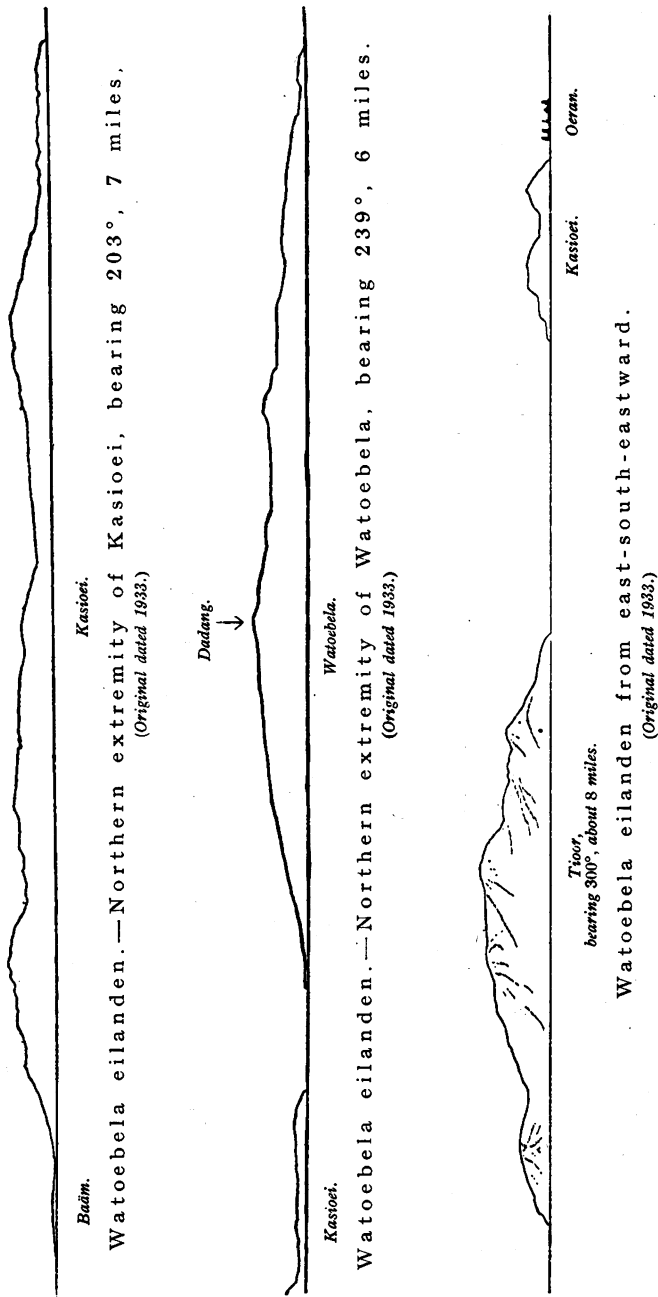


Chart 3243.

Kasioei is separated from Watoebela by Straat Horot Lomi, which is not recommended on account of the strong tidal streams which are accompanied by heavy tide-rips; the fairway is narrowed to a width of about $1\frac{1}{2}$ cables by a reef which extends from the southern side of Watoebela. The summit, which is 1,152 feet (351^m1) high, is fairly conspicuous. The greater part of the east coast is fringed by a drying reef, which extends as much as half a mile offshore, and the edge of which is steep-to. There are several villages on this coast and one on the west coast.

Koerkap (*Lat. 4° 33' S., Long. 131° 47' E.*), about $6\frac{1}{2}$ miles eastward of the southern extremity of Kasioei, is 112 feet (34^m1) high; it is fringed by a reef, which dries, and a detached reef, which dries, lies about half a mile eastward of it. Baäm, about 3 miles southward of Kasioei, is 259 feet (78^m9) high, near its northern end; between this hill and a lower one at the southern end there is a low sandy strip covered with vegetation. The island is fringed by a reef, which dries.

Tioor, about $5\frac{1}{2}$ miles southward of Baäm, is almost entirely occupied by rugged hilly land, attaining an elevation of 1,230 feet (374^m9). The northern and greater part of the east coast is fringed by a reef which dries. Shoals, with depths of $3\frac{1}{2}$ and $5\frac{1}{2}$ fathoms (6^m9 and 10^m1), lie off the middle of the eastern side of the island, about three-quarters of a mile and $1\frac{1}{4}$ miles, respectively, offshore.

Oeran lies on a reef, which dries, about $6\frac{1}{2}$ miles eastward of Tioor; it is low and sandy.

Anchorage.—Temporary anchorage may be obtained, in a depth of 21 fathoms (38^m4), stones, north-westward of Ingar, but the tidal streams here may be strong.

Temporary anchorage may be obtained northward of Ilila village, at the northern extremity of Watoebela, and in Straat Horot Lomi, but the holding ground is bad and the tidal streams are strong.

A vessel of moderate draught with local knowledge might obtain temporary anchorage off the edge of the coastal reef at Temeer Barat, a village on the western side of Kasioei, about $1\frac{1}{2}$ miles from the southern end, but the bottom is steep and stony, and there is a tidal stream.

Anchorage may be obtained off Roemah Loesi, a village on the north-eastern side of Tioor, during the East monsoon and transition periods, in a depth of about 30 fathoms (54^m9), sand and stones, out of the tidal streams. There are depths of from 38 to 49 fathoms (69^m5 to 89^m6) close outside this anchorage.

Tidal streams.—The tidal stream sets generally eastward with the rising tide at Watoebela eilanden, and westward with the falling tide. The rate between the islands is considerable, the west-going stream during the East monsoon being the stronger, and the east-going stream during the West monsoon. Northward of Baäm, in February and March, an east-going stream with a rate of $3\frac{1}{2}$ knots has been observed.

Along the north and south coasts there are heavy tide-rips during the full strength of the stream, and they should be avoided.

With a west-going stream there is slack water along the west coast of the larger islands of the group, and along the east coast with an east-going stream.

KAI EILANDEN.—This archipelago, situated south-eastward of

Charts 942b, 2759a.

Chart 3243.

the Watoebela eilanden, consists principally of Noehoe Tjoet, Noehoe Rowa group, Tajandoe eilanden, Drie Gebroeders, and Koer, Kaimeer, Tengah and Boei eilanden.

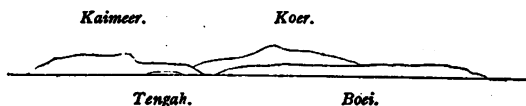
- 5 Noehoe Tjoet can be distinguished from the Noehoe Rowa group by its mountainous aspect, the latter being generally low. There are a few rivulets in Noehoe Tjoet; there are no roads, and only a foot-path between some of the villages. The original inhabitants of the group, who form the greater number, are a cross between Malays and
 10 Papuans. They live chiefly by the cultivation of coconuts and from the building of praus. Toeal, in the Noehoe Rowa group, is the capital of the group.

Standard time.—See page 10.

WESTERN GROUP. — Anchorages. — Dangers. — Kaimeer

- 15 (*Lat. 5° 10' S., Long. 132° 01' E.*), 492 feet (150^m0) high, is the northernmost island of the western group and lies about 27 miles south-south-eastward of Tioor; its remarkable terrace formation and flat upper part gives it the appearance of a large fort from seaward. (*See view facing this page*). It is sparsely covered with vegetation; most of
 20 the coconut plantations are on the west coast; on the south-eastern coast are vertical rocky cliffs, and here there are some grottos with stalactites. Kaimeer village is situated on the west coast, and in it there is a conspicuous mosque.

- Tengah lies on the steep-to reef which dries close northward of
 25 Kaimeer; it consists of a sand cay covered with coconut trees; there are some temporary dwellings on the islet. Boei, lying at the northern extremity of the same reef, is 184 feet (56^m1) high; its northern coast is steep and rocky, but not high; the southern coast is mostly bordered by a sandy beach. The islet is uninhabited,
 30 wooded, and with coconut trees on its southern side.



Western extremity of Boei, bearing 191°, 8 miles.
 (*Original dated 1933.*)

A reef, with a depth of 7 feet (2^m1), lies close off the coastal reef about three-quarters of a mile eastward of the southern extremity of Tengah, and a 6-foot (1^m8) patch lies about three-quarters of a mile farther northward.

- 35 There are no good anchorages off these islands. Temporary anchorage, however, may be obtained by vessels with local knowledge, during the South-east monsoon in the bight on the western side, in the reef between Tengah and Boei, and during the North-west monsoon off the eastern side of Kaimeer, but the latter anchorage is in a depth of
 40 38 fathoms (69^m5), very close to the reef, and there is always the possibility of the anchor slipping off the steep bank.

A vessel approaching the anchorage off the eastern side of Kaimeer from southward should pass at a convenient distance from the island; a rocky coast will first be seen, thence a small sandy beach as far as

Charis 942b, 2759a.

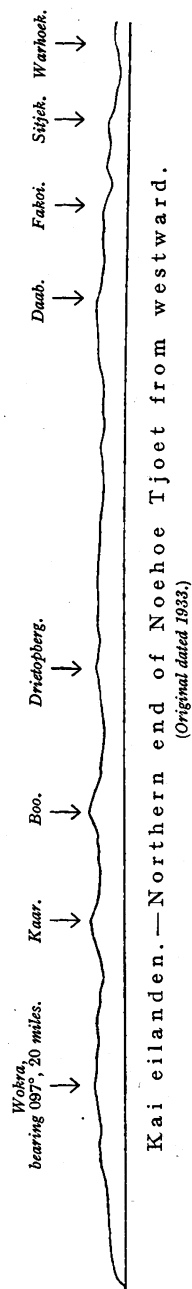
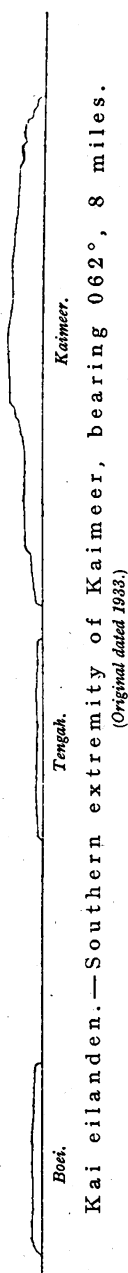


Chart 3243.

a dark, rocky mass, and farther northward another small sandy beach, in the middle of which there is a low rocky point. She should anchor with this point bearing about 248° , southward of the 7-foot (2^m1) reef, which has a depth of 5 fathoms (9^m1) at its southern extremity. 5

A shoal, with a depth of 16 feet (4^m9), lies about 9 miles north-north-westward of Boei, and two shoals, with depths of 29 and 36 feet (8^m8 and 11^m0), lie about 7 miles northward and $6\frac{1}{2}$ miles north-north-eastward, respectively, of Boei.

Koer, about 7 miles southward of Kaimeer, is 1,385 feet (422^m1) 10 high, in Namsar (*Lat. $5^{\circ} 21' S.$, Long. $131^{\circ} 59' E.$*), a sharp peak when seen from northward, situated about the middle of the island. At the



Namsar, bearing 141° , 8 miles.

(Original dated 1933.)

northern extremity of the island is Soar, a flat summit, 286 feet (87^m2) high. The hilly land is steep on the east coast, but slopes gradually to the western side. Tanjong Songlijer, the northern extremity, is 15 high, Tanjong Sermaaf, the north-western point, is a low spur, and Tanjong Batoeal, the southern extremity, is high and rocky. See view on page 148.

The coastal reef surrounding Koer is very steep-to, and consequently there are no good anchorages. A vessel with local knowledge may, 20 however, obtain a temporary anchorage, in a depth of 38 fathoms (69^m5), during the South-east monsoon, near the coastal reef, off Nam village, situated on the west coast about $2\frac{1}{2}$ miles northward of Tanjong Batoeal; the bottom here is mostly sand. There is an inlet in the coastal reef here, which makes a good harbour for small vessels with 25 local knowledge.

There are several small villages in Koer, most of which are on the west coast standing in the midst of coconut plantations.

Drie Gebroeders.—These islands, lying at the southern end of the western group of Kai eilanden, consist of Manggoer, Wonin and 30 Fadol, with no off-lying dangers.

Manggoer, 135 feet (41^m1) high, lies about 11 miles southward of Koer; it is fringed by a reef which dries. Its northern end, where the inhabitants dwell, is low. Wonin, the north-western island, is 99 feet (30^m2) high; it is almost entirely fringed by a drying reef. It is 35 uninhabited, although there are coconut plantations on it. Fadol, the southernmost island, is 443 feet (135^m0) high, and has a general steep appearance; its coasts can be closely approached, especially on the eastern side; a drying reef extends from the other sides, especially from the low northern part, where a village is situated. 40

The only suitable anchorage off these islands is off the north-western extremity of Manggoer during the South-east monsoon, and off its north-eastern side during the North-west monsoon.

TAJANDOE EILANDEN.—This group, consisting of three islands and several islets, lies eastward of Drie Gebroeders. The principal 45 peaks are the summit of Taam, 437 feet (133^m2) high, the southern-

Charts 942b, 2759a.

Chart 3243.

most island of the group; Ree, 102 feet (31^m1); the peak near the western extremity of Walir, 187 feet (57^m0) high, the middle island of the group; the peak on Heniaar, 180 feet (54^m9) high, close eastward of Walir; and the hill Radja, 279 feet (85^m0) high, on the north-western extremity of Tajandoe, the northernmost island.

Tajandoe.—Off-lying dangers.—There is a bight on the north-eastern side of Tajandoe, but it is encumbered with dangers in its entrance, which are not marked by discoloration, and is therefore not recommended as an anchorage. There is a village at the head of the bight. Matotjanat, a rock covered with vegetation, lies close off Tanjong Matot, the north-eastern extremity of the island. In Jembro village, on the north-western extremity of the island, there is a conspicuous mosque. Noetfer, a sandy islet, covered with light vegetation, lies on the coastal reef about half a mile northward of Jembro.

Rembang (*Lat. 5° 26' S., Long. 132° 23' E.*), a reef, with a least depth of 6½ fathoms (11^m9), sand and stones, occasionally slightly marked by discoloration, lies 6 miles north-north-eastward of the northern extremity of Tajandoe. Telegraaf riffen, consisting of two shoals, seldom marked by discoloration, lying close together with a least depth of about 8½ fathoms (16^m0), lies 3½ miles northward of Tanjong Matot.

A dangerous shoal, the depth over which is not known, was reported, in 1937, to lie about 3½ miles north-north-eastward of Tanjong Watloes, the western extremity of Tajandoe. A shoal, with a depth of 19 feet (5^m8), slightly marked by discoloration, lies about 2½ miles north-north-eastward of the same point.

Huisman rif, with a depth of 3 fathoms (5^m5), sand and stones, lies about 6 miles north-westward of Tanjong Watloes; it is scarcely marked by discoloration, but owing to the clear water, the bottom can be seen. A bank, with a depth of 8½ fathoms (16^m0), lies 7½ miles west-south-westward of Tanjong Watloes, and a shoal, with a depth of 29 feet (8^m8), lies about 2½ miles west-south-westward of the same point.

Walir.—This island is separated from the south-western side of Tajandoe by a passage encumbered with reefs which dry; it is uninhabited. Jamtil village, in which there is a conspicuous mosque, stands on the northern extremity of Heniaar. Watleu, an islet, lies on the drying reef extending from the southern extremity of Walir. Ree and Reejanat are two islets lying on a drying reef, separated from the western side of Walir by a channel encumbered with shoals at its southern end. Reejanat is low and thickly covered with vegetation.

Taam.—This island, about 7 miles south-westward of Walir, is fringed by a drying reef and is steep everywhere. A number of rocks, covered with vegetation, lie on the fringing reef on the western side of the island. Watfera, one of these rocks, lying close southward of the western extremity, is steep with a flat summit, on which there is a tree, and seen from northward, appears to be a vessel with one mast; a white rock lies close northward of it.

The only anchorage is westward of Ohitoom village, situated about half a mile southward of Watfera, in depths of from 14 to 33 fathoms (25^m6 to 60^m4), although it is not very satisfactory during the South-east monsoon, when the sea gets up, especially with a south-going stream.

Noeniai, Noesreen and Noewait, which lie together on a drying reef, about 1½ miles north-eastward of Tanjong Toengor, the northern

Chart 3243.

extremity of Taam, are low and sandy islets, except Noewait, which is covered with coconut trees.

NOEHOE ROWA GROUP.—This group consisting of two islands and a number of islets, is generally low. The southern and larger island is named from north to south: Noehoe Tawoen, Noehoe Efroean and Noehoe Toetoet. Kai Doelah, the other island, is separated from Noehoe Efroean and Noehoe Tawoen by Straat Rosenberg. There are a few hilly ridges, from about 200 to 300 feet (61^m0 to 91^m4) high, on the larger island, and Gelanit, a peak on the eastern side of Noehoe Tawoen, about 3½ miles south-south-westward of the northern extremity, attains an elevation of 390 feet (118^m9).

Northern part of Noehoe Rowa.—Dangers.—Ender rif (Lat. 5° 20' S., Long. 132° 41' E.), with a depth of 19 feet (5^m8), lies about 13½ miles north-north-westward of Tanjong Serbat, the low and sandy northern extremity of Kai Doelah.

Chart 3440, plan of Northern portion of Noehoe Rowa.

Batavier rif, with a depth of 17 feet (5^m2), and Datoe rif, with a similar depth, lie 3 miles north-eastward and one mile northward, respectively, of Maas, an islet situated 6½ miles north-north-westward of Tanjong Serbat. Tegal rif, with a depth of 23 feet (7^m0), lies 3 miles north-north-eastward of Tanjong Serbat. These reefs are all marked by discoloration.

Maas and Baëer, an islet close westward, are low and covered with coconut trees. Between Maas and Tanjong Serbat are the islands Soea and Roemadan, and between the latter and the northern end of Noehoe Tawoen is Doe Rowa.

Charts 3440, plan of Northern portion of Noehoe Rowa, 3243.

Straat Doe Rowa and approaches.—Dangers.—Beacons.—Straat Doe Rowa, between the southern side of Doe Rowa and Noehoe Tawoen, has a navigable width of about half a mile between the reefs on either side. In its western approach are Er and Godon, two low islets covered with coconut trees, each lying on a detached reef about half a mile apart about 3 and 1½ miles, respectively, north-westward of Tanjong Ngidioen, the north-western extremity of Noehoe Tawoen. There is a conspicuous tree on the western side of Er.

A detached reef, which dries, and well marked by discoloration, lies about one mile northward of the north-western extremity of Er; on its south-eastern extremity there is a conspicuous white sand patch. A shoal, with a depth of 16 feet (4^m9), lies about three-quarters of a mile northward of this reef, and a 26-foot (7^m9) patch lies about one mile eastward.

Chart 3440, plan of Northern portion of Noehoe Rowa.

Two shoals, neither of which are marked by discoloration, with depths of 19 and 26 feet (5^m8 and 7^m9), lie about 2½ and 3 miles, respectively, north-eastward of Tanjong Ngidioen.

Two iron beacons, each surmounted by a black truncated cone, lie on the southern edge of a detached reef off the south-western side of Doe Rowa and on the edge of the reef which fringes the southern side of that island, respectively.

There is a bight on the northern side of Noehoe Tawoen, which is encumbered with shoals; at its head is Ohoideer village, in which there is a conspicuous church. Kroes and Oet are low islets lying on the

Chart 3440, plan of Northern portion of Noehoe Rowa.

southern side of the fairway northward of this bight. There is a conspicuous sandy beach on the northern side of Kroes. About 2 miles eastward of Oet is the island, Oeboer.

- 5 In the north-eastern approach to Straat Doe Rowa there is a shoal with a least depth of 23 feet (7^m0) in the fairway, 1½ miles westward of Tanjong Serbat, and there is a shoal, on which there is a rock above water, about half a mile eastward of the eastern extremity of Doe Rowa.

Tidal streams.—The tidal streams in Straat Doe Rowa set east-
10 ward with the rising tide, and westward with the falling tide.

Chart 3440, plans of Northern portion of Noehoe Rowa, and Approaches to Toeal.

- Reede Toeal.—Dangers.—Beacons.**—This roadstead is situated between the western side of Kai Doelah and the northern end of
15 Noehoe Tawoen. Between Doelah (Doeflah) village, on the western side of Kai Doelah, about 3¼ miles south-south-westward of Tanjong Serbat (*Lat.* 5° 31' S., *Long.* 132° 48' E.), and Toeal village, 4½ miles farther southward, there are some relatively high hills, attaining an elevation of 376 feet (114^m6).

- 20 The limits of the roadstead are imaginary lines drawn in a 225° direction through the point situated 2 miles south-south-westward of Doelah village, and 045° through the south-eastern extremity of Fair (see below).

- A detached reef, with a least depth of 3 feet (0^m9), situated about
25 half a mile east-south-eastward of the south-eastern extremity of Oeboer, is marked by a black beacon surmounted by a cone. Another detached reef, with a least depth of 3 feet (0^m9), lies with its northern end about 6½ cables southward of the same point, and is marked by two beacons, each surmounted by a white ball, one at the northern end
30 and the other about 2 cables from the southern end.

A safe anchorage may be obtained during both monsoons in Reede Toeal, in depths of from 11 to 13 fathoms (20^m1 to 23^m8). Anchorage may also be obtained during the South-east monsoon off Doelah village; heavy squalls occur here during the North-west monsoon.

- 35 There is a small shallow inlet in Kai Doelah, abreast Toeal village, available for small craft. The northern edge of the reef which extends from the western side of this inlet, is marked by an unofficial beacon, surmounted by a triangle; there is a small pier abreast this beacon.

- Toeal, the principal village of Kai eilanden, is the headquarters of
40 a Government official. Provisions can be obtained. There is a mosque in the village.

- Bocht van Gelanit is an inner bay, separated from Reede Toeal, by Fair, a low island, consisting of two basins, with depths of over 5 fathoms (9^m1), connected with each other by a bar, with a least depth of 12 feet
45 (3^m7). The entrance channel southward of Fair is narrow and tortuous, with a least depth of 18 feet (5^m5), and is only available for small craft with local knowledge.

Rainfall.—See page 25.

Chart 3440, plan of Northern portion of Noehoe Rowa.

- 50 **Directions.**—A vessel approaching Reede Toeal from northward should steer for Tanjong Serbat bearing 180°, which leads about 1½ miles westward of Tegal rif. When the conspicuous rocky islet lying close off Tanjong Lobi, situated about 4 miles south-south-westward of Tanjong Serbat, bears 210°, she should steer for it on that bear-

Chart 3440, plan of Northern portion of Noehoe Rowa.

ing until abeam of Doelah village, when she should steer for the sandy patch on the north-eastern point of Oeboer, situated about $1\frac{1}{2}$ miles westward of Tanjong Lobi, bearing about 246° , until the mosque at Toeal is open westward of the point northward of it, when she should alter course southward and be guided by the beacons to the roadstead. 5

A vessel approaching from north-westward should, from a position about 10 miles northward of Tanjong Ngidioen, steer for that point, bearing 180° which can always be easily identified, until Godon is nearly abeam, when she should alter course eastward and keep the north-western quarter of Er, astern, open northward of Godon, passing between the 19 and 26-foot (5^m8 and 7^m9) shoals north-eastward of Tanjong Ngidioen; the two beacons on the northern side of Straat Doe Rowa, which should here be kept open, are sometimes difficult to distinguish from westward or north-westward. 15

A vessel with local knowledge can pass between the 26-foot (7^m9) shoal mentioned above and the western beacon by keeping the south-western extremity of Oet (*Lat. $5^\circ 36'$ S., Long. $132^\circ 40'$ E.*) in line with the somewhat flat hill Gelanit, bearing about 161° , and also in line with the western extremity of Kroes. When the two beacons come in line, bearing about 085° , the vessel should alter course eastward and steer into the strait, keeping towards the northern side until Moeha Noehoe Janat, a small islet lying close off the middle of the southern side of Doe Rowa, bears 000° , when she should steer round the northern end of Oeboer and be guided by the beacons into Reede Toeal. 25

A vessel approaching Straat Doe Rowa from south-westward should pass between Tanjong Ngidioen and Godon, steering for the rocky southern extremity of Soea (page 151), bearing about 049° . The north-western point of Ngaf, an island situated about 2 miles south-westward of Tanjong Ngidioen, should be kept open north-westward of that point until the two beacons on the northern side of the strait are nearly in line, when the vessel should follow the directions for approaching from north-westward. 30

Chart 3243.

Western side of Noehoe Rowa group.—Coast.—The western coast is mostly rocky, varied by an occasional sandy beach and fringed in places by a wide reef which dries; the land is hilly. The villages on the coast are often rendered conspicuous by a small church or mosque. Totoad village, which is especially conspicuous owing to its mosque, is situated on the southern side of the entrance to an inlet extending southward; it is the headquarters of a rajah of the surrounding district of the same name, and there is a small pier here. Two islets lie in the entrance to this inlet; two villages stand on the eastern shore of the inlet, about one mile and $2\frac{3}{4}$ miles, respectively, southward of the islets. There is usually a strong stream running out of this inlet. The coast southward of the entrance to this inlet is low and sandy for about $3\frac{1}{2}$ miles, as far as Watngit village, thence it becomes steeper towards Tanjong Arat, the south-western extremity of Noehoe Toetoet. 45

Off-lying islands and dangers.—A 23-foot (7^m0) patch lies about $1\frac{1}{2}$ miles south-westward of Ngaf, and Mitliler, with a depth of 15 feet (4^m6), lies about $2\frac{1}{2}$ miles southward of the same island. Foul ground extends about 4 miles southward from Oehiwa, an island lying $4\frac{1}{2}$ miles southward of Ngaf. Oehiteer is an island lying on the eastern edge of this foul ground about a mile south-south-eastward of Oehiwa. 50

Chart 3243.

A reef, which dries, lies about three-quarters of a mile westward of the southern extremity of Oehiteer, and a detached shoal, with a depth of 13 feet (4^m0), marked by discoloration, lies about 2½ miles south-westward of the same point.

Numerous islands and reefs lie from 7 to 13 miles from the western side of the main island of Noehoe Rowa group, with deep channels between them which are easily navigated if the reefs are visible. The outermost danger off Noehoe Ebroean is Mitfeer, with a depth of 23 feet (7^m0), lying nearly 8 miles offshore, about 8½ miles south-westward of Ngaf.

Oer (*Lat.* 5° 51' S., *Long.* 132° 32' E.) and Oetir, 236 and 184 feet (71^m9 and 56^m1) high, respectively, lie on a reef which dries, nearly one mile apart, about 7 miles west-north-westward of Tanjong Arat. A 4½-fathom (8^m7) patch lies about 2½ miles westward of the northern extremity of Oetir. Noehoe Taa is a low sand patch lying in the middle of a reef which dries, about 3 miles westward of Oetir. Var, a rock, 79 feet (24^m1) high, lies on the southern edge of the reef. A 4½-fathom (8^m7) patch and a 2½-fathom (5^m0) patch lie about one mile north-westward and 7 cables northward, respectively, of the northern side of Noehoe Taa.

Kai Tanimbar, the south-westernmost island of the group, is 174 feet (53^m0) high, and rocky, lying about 5½ miles south-south-westward of Oetir; there is a conspicuous round-topped tree on its summit. Warna is a small islet lying on the fringing reef close off the northern extremity of the island. Atnebar village stands on a steep hill at the head of the bight, which partly dries, on the northern side of the island. There is a small harbour, which dries, for praus close off the village.

A shoal, with a depth of 33 feet (10^m1) and an 8-fathom (14^m6) patch lie about 5½ miles south-south-eastward and 13 miles south-eastward, respectively, of the southern extremity of Kai Tanimbar. Two shoals, with depths of 42 and 29 feet (12^m8 and 8^m8), lie about 4 miles south-eastward and 7 miles eastward, respectively, of the eastern extremity of the same island.

Directions.—A vessel proceeding from Toeal to Totoad, after passing through Straat Doe Rowa, and westward of Ngaf, should steer for the western extremity of Nai, an island, 194 feet (59^m1) high, about 5 miles south-south-westward of Ngaf, bearing 180°, until the conspicuous hill Gelanit bears 088°, when she should steer for the eastern half of Liek, an islet bearing about 151°, until the southern extremity of Hoa, an islet situated about half a mile southward of Nai, is in line with the southern extremity of Vatilmas, bearing about 266°; thence she should alter course southward and pass on either side of the 13-foot (4^m0) shoal about 2 miles south-south-westward of Oehiteer, and when the northern side of Tonguin, an island situated about 2½ miles southward of Hoa, bears 264°, she should alter course eastward and steer with it on that bearing astern, which leads northward of Liek, and thence to the anchorage, taking care to avoid the 11-foot (3^m4) patch about half a mile south-westward of Wahroe, situated about 1½ miles south-eastward of Oehiteer.

There is a shorter route for vessels with local knowledge by passing between Tanjong Ngidioen and Ngaf, thence following the coast as far as Wahroe, but it is essential that the reefs should be plainly visible.

Eastern and southern sides of Noehoe Rowa group.—Off-lying

Chart 3243.

dangers.—The southern part of the eastern side of Kai Doelah is somewhat lower than the northern part. Tanjong Vadsit, the southern extremity, is a steep headland, 36 feet (11^m0) high. Naām village is situated on the sandy north-eastern point of the island. 5

Straat Rosenberg, which separates the south-western side of Kai Doelah from Noehoe Efroean and Noehoe Tawoen, is narrow and tortuous, and has a depth of not more than 6 feet (1^m8).

From a position just northward of Tanjong Vadsit to Abean village, about 9½ miles southward of that point, the depths lying within 100 10 fathoms (182^m9) are very irregular, and there are a number of dangers lying within 1½ miles of the coast, including two sandy patches which dry, the northern, situated about 2½ miles eastward of Tanjong Vadsit (*Lat.* 5° 42' S., *Long.* 132° 48' E.), and the southern with its northern extremity about 2 miles south-eastward of that point. Between Abean 15 and Tanjong Hoar, a rocky point nearly 6 miles south-south-westward, the coast is low.

Between Tanjong Hoar and Tanjong Moeslenar, a rocky point about 3 miles westward, the coast is fringed by a reef which dries, and a bank, with depths of from 6 to 16 feet (1^m8 to 4^m9), extends about 2 miles 20 southward from the latter point. Mitroa, a shoal with a depth of 16 feet (4^m9), and usually slightly marked by discoloration, lies 3 miles southward of the same point.

Telok Oef, entered between Tanjong Moeslenar and Tanjong Doan, about 1½ miles westward, affords sheltered anchorage in both monsoons, 25 in depths of from 5½ to 6½ fathoms (10^m1 to 11^m9), sand. Noiko, a small islet, lies about half a mile south-south-eastward of Tanjong Doan, and three shoals, with depths of from 13 to 19 feet (4^m0 to 5^m8) lie in the middle of the entrance. Tanjong Doan is easily identified by its yellowish red colour of the rocks, and by the crest of the 194-foot 30 (59^m1) hill about one mile northward of it.

To enter the bay a vessel should steer for the mangrove point on the western side, about 1½ miles north-eastward of Tanjong Doan, bearing 000°, until a conspicuous rocky point on the eastern shore about three-quarters of a mile northward of Tanjong Moeslenar bears 35 about 090°, when she should keep in mid-channel. It is unadvisable to pass between Tanjong Doan and Noiko.

Anchorage may be obtained by vessels with local knowledge off Ohoideer Toetoet village, situated on the eastern shore of the bight between Tanjong Doan and Tanjong Arat. There is a small but con- 40 spicuous church in the village.

NOEHOE TJOET.—Aspect.—This island, the easternmost of the Kai eilanden, is separated from Noehoe Rowa group by Straat Nerong. It is generally mountainous with spurs extending to the coast on either side. The peaks at the northern end of the island are more difficult to 45 identify than those farther southward. The principal peaks, which are all wooded, from north to south are :—Wokra, 2,254 feet (687^m0) high ; Kaar, 2,431 feet (740^m9) high, with a sharp summit ; Boo, 2,599 feet (792^m2) high, with a serrated summit ; Drietopberg, 1,932 feet (588^m9) high, which has three peaks of the same elevation, situated about 50 3 miles southward of Boo ; Daab, 2,621 feet (798^m9) high, the highest peak, with a blunt cone, which is usually obscured by clouds ; Fakoi, 2,028 feet (618^m1) high, descending vertically on its south-eastern side,

Chart 3243.

and having numerous bare yellow stony patches, situated $2\frac{1}{2}$ miles southward of Daab; Sitjek, 1,490 feet (454^m1) high, with a truncated cone, situated about 2 miles south-westward of Fakoi; Warhoek, 1,814 feet (552^m9) high, has the appearance of the back of an elephant with its head facing southward. Thence to Tanjong Wedoeear, the steep southern extremity of Noehoe Tjoet, the highest peak is Nonaibal, with an elevation of 1,883 feet (573^m9), situated about 11 miles from Tanjong Wedoeear; Advilnas, 1,244 feet (379^m2), about 2 miles northward of Nonaibal, is also conspicuous. See view facing page 148.

Straat Nerong.—This channel is deep and clear of dangers in the fairway. Approaching from southward or south-westward, the high land of Noehoe Tjoet will first be sighted resembling two coffins, one very large, formed by the mountains and hills between Fer village, situated about 4 miles north-north-eastward of Tanjong Wedoeear, and Nonaibal, and the other, much smaller and lower, at the southern extremity of the island, formed by the ridge between Tanjong Wedoeear (Lat. $6^\circ 00' S.$, Long. $132^\circ 50' E.$) and Wedoeearfer village, about $1\frac{1}{4}$ miles northward.

WESTERN SIDE OF NOEHOE TJOET.—Coast.—The principal landmark at the northern end of the island, is the moderately high spur from the mountains which terminates in Tanjong Borang, the northern extremity, and which is usually the first land sighted from northward. The mountains farther southward are usually obscured by clouds.

Telok Wair, entered between Tanjong Borang and Tanjong Patingroe, about 2 miles west-south-westward, affords safe anchorage to vessels with local knowledge during the South-east monsoon, in a depth of about 22 fathoms (40^m2), at a moderate distance offshore. Wair village is situated at the head of the bay.

The west coast is less steep-to than the eastern, especially along the northern half, but vessels can navigate relatively close offshore. Tanjong Patingroe is a rocky headland, 30 feet (9^m1) high, formed by a gently sloping spur, and is rendered conspicuous by the rock close north-westward of it. Thence to Hor village, about $4\frac{1}{2}$ miles south-south-westward, the coast is moderately high, with numerous white patches on the grey rocks. Southward of Woho, a mountain 1,854 feet (565^m1) high, which rises almost vertically, situated about three-quarters of a mile north-eastward of Hor, the coast continues rocky with fairly conspicuous points, and the mountains recede inland. There are several villages on this coast, all of which are conspicuous, and some have white mosques.

Anchorage may be obtained anywhere during the South-east monsoon, in depths of from 18 to 30 fathoms (32^m9 to 54^m9); there are however, heavy squalls during that period.

Off-lying dangers.—There are several shoals, which dry, lying within 2 miles of the coast between Tanjong Hebri, situated about 11 miles south-south-westward of Tanjong Patingroe, and Tanjong Jarleier, about $8\frac{1}{2}$ miles farther southward. Of these, Mitoeat lies about 3 miles south-westward of Tanjong Hebri; Mitdoean, in two parts, lies about one mile farther southward, and Mitnaloea lies about $1\frac{1}{2}$ miles west-south-westward of Tanjong Jarleier. A 10-foot (3^m0)

Chart 3243.

patch lies about $1\frac{1}{2}$ miles southward of Mitdoean. The channel between these dangers and the coast is deep and safe.

Baai van Elat.—Dangers.—Beacons.—Buoys.—This bay, entered about 2 miles south-south-westward of Tanjong Jarleier, affords a safe anchorage at all times of the year. The eastern side of the bay consists of undulating land covered with reeds and coconut palms, rising to Sitjek, about $1\frac{1}{2}$ miles inland. The rocky islets Noehoe Roe, Krad and Sfat lie on reefs, which dry, on the eastern side of the bay, and Noehoe Jaan, 66 feet (20^m1) high, lies on the western side of the entrance. There is a deep channel eastward of Sfat leading to Elat village.

A beacon, surmounted by a white ball, stands about $1\frac{1}{2}$ cables off the north-eastern point of Noehoe Jaan (*Lat.* $5^{\circ} 38' S.$, *Long.* $132^{\circ} 59' E.$). A beacon, with a black truncated cone, marks a 13-foot (4^m0) patch, situated about $3\frac{1}{2}$ cables west-south-westward of Krad. A white conical buoy marks a 13-foot (4^m0) patch, situated about 6 cables north-westward of the northern extremity of Sfat. A beacon, with a black truncated cone, is situated about $1\frac{1}{2}$ cables westward of the western extremity of Sfat. A white and black chequered conical buoy marks a 23-foot (7^m0) patch, situated about 4 cables west-south-westward of the same point.

The passage between the southern extremity of Noehoe Jaan and the main island is only available for small vessels with local knowledge.

Anchorage.—Directions.—Anchorage may be obtained by vessels with local knowledge during the South-east monsoon, in a depth of about 14 fathoms (25^m6), sand, westward of the pier (*see* below). During the North-west monsoon it is better to anchor nearer Noehoe Jaan, in depths of from 14 to 16 fathoms (25^m6 to 29^m3), sand and coral, with Raharin village, situated on the southern shore about $6\frac{1}{2}$ cables south-westward of the pier, bearing 180° .

A vessel approaching the harbour should steer for a light green hill on Sfat, which is visible a considerable distance, until the beacons and buoys are identified, when there is no difficulty in entering; it should, however, be noted that foul ground extends about $1\frac{1}{2}$ cables outside the beacon north-eastward of Noehoe Jaan.

Elat.—This village, also known as Bandan Elat, stands at the head of the bay. There is a pier here with a red shed on it, with a depth of 16 feet (4^m9) off its head. Eastward of this pier there is another small pier, which, in 1933, was in a state of decay, with a flagstaff at its root.

Provisions may be obtained.

Coast.—From the western entrance of Baai van Elat to Werka village, about 4 miles south-south-westward, the coast is bordered by rocks rising steeply from the sea, some of which are 66 feet (20^m1) high. At Tanjong Laer Majoran, about $1\frac{1}{2}$ miles northward of Werka, there is a conspicuous waterfall, from which boats can obtain water; a vessel can anchor in its vicinity. From Werka to Tanjong Larat, about 7 miles southward, the coast is relatively low and undulating. There is a small inlet at Nerong village, 5 miles southward of Werka, suitable for small vessels with local knowledge. Tanjong Larat is fringed by a reef which dries, on which are some rocks, named Aran.

Off-lying danger.—A shoal, which dries, with a 6-foot (1^m8)

Chart 3243.

patch close northward of it, lies about $1\frac{1}{2}$ miles offshore, about $4\frac{1}{2}$ miles south-south-westward of Tanjong Laer Majoran.

Coast.—Between Nerong and Fer, about 11 miles south-south-westward, very heavy squalls are experienced during the South-east monsoon. The most conspicuous objects on this stretch of coast are : a white rock on the point westward of Nonaibal ; Hoiko village, at the head of a small inlet situated at the foot of a mountain with vertical sides about $3\frac{1}{2}$ miles south-south-westward of Tanjong Larat, and
10 which can only be reached by praus ; Doefin (*Lat. $5^{\circ} 52' S.$, Long. $132^{\circ} 52' E.$*); an islet lying on the coastal reef close southward of this inlet ; the bay, at the head of which are the villages of Soengi and Ngafan, about 2 miles southward of Doefin ; and the rocky islet, named Rerean, lying on the coastal reef, about $1\frac{1}{2}$ miles farther south-
15 ward.

About three-quarters of a mile northward of Fer village the coastal reef bends sharply westward and extends about $4\frac{1}{2}$ cables offshore, and close outside it there is a sand patch above water, which is sometimes white and at other times a dark colour, but is always plainly
20 visible. Foul ground extends about $4\frac{1}{2}$ cables southward from this sand patch and about the same distance offshore. The village partly stands on two terraces on the slope of the land. About 4 cables southward of it is Langgear village, in which there is a conspicuous mosque. Between the two villages there is a plain planted with
25 coconut trees.

Anchorage may be obtained by vessels with local knowledge in any convenient depth, approaching with the mosque in Fer village bearing about 124° , but care must be taken to avoid the tongue of reef with a depth of less than 10 feet (3^m0) which extends about 3 cables offshore
30 close south-westward of this line of bearing.

EASTERN SIDE OF NOEHOE TJOET.—**Coast.**—This side of the island is very steep-to and consequently there are no good anchorages ; heavy squalls occur almost everywhere. During the transition period between the North-west and the South-east mon-
35 soons, whenever there are no heavy squalls, and there is no likelihood of easterly winds, a vessel can obtain anchorage anywhere along the coast, in depths of from 27 to 38 fathoms (49^m4 to 69^m5), sand.

From close south-eastward of Tanjong Borang (page 156) to Tanjong Oratoe, about 2 miles south-eastward, the coast is bordered by rocks
40 interspersed with sandy beaches, and foul ground, on which there is a patch of sand which dries, extends over three-quarters of a mile offshore. Labuan Daboe is a channel with depths of over 5 fathoms (9^m1), lying westward of the sand patch ; in its entrance there is a depth of $3\frac{1}{2}$ fathoms (5^m9), about $4\frac{1}{2}$ cables north-eastward of Tanjong
45 Vorwahan, situated about three-quarters of a mile south-south-eastward of Tanjong Borang.

Hoh baai, entered between Tanjong Vorwahan, and a point about 4 cables north-north-westward, has a bar, with a least depth of 23 feet (7^m0) in its entrance. To enter, a vessel should pass about one cable
50 from Tanjong Borang, where the coastal reef is fairly well marked by discoloration. There are some huts on the western side of the bay. Only vessels with local knowledge should attempt to enter.

Anchorage may be obtained in Reede Oer, about 4 miles south-

Chart 3243.

south-westward of Tanjong Oratoe, in a depth of about 30 fathoms (54^m9), sand, about 2½ cables from the coastal reef; the mountain stream Wer Oer flows out here. Watnoes, a mountain, 2,021 feet (616^m0) high, about 2 miles north-westward, appears as a sharp peak from the anchorage in clear weather. The peak, in line with the middle of the valley, through which the Wer Oer flows, leads to the anchorage; if the peak is not visible the bridge over the Wer Oer, just northward of the village, should be steered for, bearing between 292° and 315°.

About 2½ miles southward of Oer village is Bandan Eli village, in which there is a conspicuous mosque; the village can also be identified by the numerous dark red roofs of the buildings. Approaching from southward it is hidden behind Tanjong Kawoes (*Lat. 5° 25' S., Long. 133° 09' E.*), a high point with a small cupola on it. At Hollat village, about 6 miles south-south-westward of Bandan Eli, there is a small opening in the coastal reef, in which small craft with local knowledge may obtain good anchorage. At Kilwaer village, about 4 miles south-south-westward of Hollat, there is a flagstaff. About 1½ miles south-south-westward of Kilwaer is Jantimoer village, in which there is a small conspicuous church.

Tanjong Wahadan, 2½ miles southward of Jantimoer, is rocky and rises steeply to the mountains inland. About 5½ miles farther south-westward is Jamtil village standing on a steep hill, 66 feet (20^m1) high, and about 5 miles south-westward of Jamtil is Ohoiwait village, standing in a conspicuous position on a steep hill, and in the middle of it is an enclosure surrounded by a low stone wall.

Anchorage may be obtained by vessels with local knowledge, in depths of from 16 to 22 fathoms (29^m3 to 40^m2), off Wedoeear village, situated on a hill about 2 miles north-westward of Tanjong Obahan, which lies 11½ miles north-north-eastward of Tanjong Wedoeear, with the conspicuous house of the Governor, standing close southward of the village, bearing 235°. There is a shoal, with a depth of 4½ fathoms (8^m7), not marked by discoloration, lying about 2½ cables offshore, east-south-eastward of the village.

Tanjong Obahan terminates in rocks about 30 feet (9^m1) high.

Chart 470.

AROE EILANDEN.—These islands, lying about 65 miles eastward of Kai eilanden and about the same distance from the coast of New Guinea, are mostly low and covered with vegetation. It is advisable not to approach them within depths of less than 10 fathoms (18^m3) except in case of necessity. The principal islands of the group are Kola, Wokam, Kobroör, Maikoör (Maikur), and Trangan, which are only separated from one another by narrow channels, which are of no importance for general navigation. The most important place in the group is at Dobo (page 163) on Pulau Warnar off the western side of Wokam.

The islands are sparsely populated. The Malay language is understood throughout. Most of the villages on the east coast are built on rocks, and can only be reached on the seaward side by a ladder. The inhabitants live by agriculture and fishing. The entire trade is centred round Dobo, and pearl fishing is carried out extensively throughout the year, off the west coast during the South-east monsoon, and off the east coast during the North-west monsoon.

Charts 942b, 2759a.

Chart 470.

Tidal streams.—Both northward and southward of the group, in the open sea, the tidal streams set generally eastward with the rising tide and westward with the falling tide.

- 5 Along the northern coast the stream sets south-east by east with the rising tide, and eastward of the Djedan eilanden (Jedan islands) curves to south-east by south and south-south-east, and then maintains the direction of the east coast as far as Mariri (*Lat.* $6^{\circ} 09' S.$, *Long.* $134^{\circ} 52' E.$), off Kbroör, where it meets the stream setting between east
10 and east-north-east southward of the group, and turns northward. Thus between the parallels of $6^{\circ} 10' S.$ and $6^{\circ} 20' S.$ circular streams are formed, which, with the rising tide, set mainly on to the coast, and with the falling tide set away from it. On the southern side of the entrance to the channel which separates Mariri eilanden from
15 Penamboelai, the streams appear to turn anti-clockwise, and on the northern side, clockwise.

- From the zone referred to above, when there is a west-going stream northward and southward of the Aroe eilanden, the streams off the east coast set in different directions. Northward of the parallel of
20 $6^{\circ} 10' S.$ the stream sets between north-north-east and north until abreast the Djedan eilanden, and thence northward mainly between north-north-west and north-west by north. Southward of the parallel of $6^{\circ} 10' S.$ the stream sets southward, but sometimes takes a more easterly direction off the entrances to the channels between the main
25 islands; southward of Djin eilanden, off the south-eastern side of Trangan, the stream sets west-south-west.

- There is a maximum rate of about 2 knots off the north and south coasts, with both the east-going and west-going streams. Close off the northern extremity the rate is sometimes as much as $2\frac{1}{2}$ knots,
30 and attains 3 knots close off the southern extremity, whilst the directions here are irregular. At the full strength of the streams, strong tide-rips, caused by the irregular depths, and having the appearance of dangerous shoals, are experienced near both the north and south coasts.

- 35 Along the west coast the stream sets southward parallel to the coast when it is setting eastward along the north and south coasts, and in the reverse direction when it is setting westward along those coasts; a rate of more than $1\frac{1}{2}$ knots has not been observed along the west coast.

- 40 In the entrances to the channels between the main islands there is frequently a strong out-going stream, which is only interrupted by a strong in-going stream during a few hours with the rising tide, and there may be a short period of slack water.

Standard time.—See page 10.

- 45 **NORTHERN SIDE OF AROE EILANDEN.**—Warilaoe, the northernmost island, is separated from the northern side of Kola by Kola Watoe; it is wooded, with high trees, and like the other islands in its vicinity, is uninhabited. There is a detached drying reef, with a grass-covered islet on its south-western side, about one mile north-
50 eastward of Tanjong Watoleidjoering (Watuleijuring), the northern extremity of Warilaoe. Ngoba, an islet lying about one mile off the north-western side of Warilaoe, is wooded. On the south-eastern side of the detached drying sandbank close south-westward of Ngoba,

Chart 470.

there is a small islet covered with grass on its south-western side. Toba, an islet lying about $1\frac{1}{2}$ miles westward of Wariloe, is low but covered with high trees.

Djedan eilanden (Jedan islands), lying within $6\frac{1}{2}$ miles eastward of Wariloe, are low but wooded. On Djedan, the outer island, there is a conspicuous tree on its western side, whilst the trees on the eastern side attain an elevation of about 160 feet (48^m8). The bank which extends northward from Djedan eilanden dries about 3 feet (0^m9). When these banks commence to dry a strong tidal stream flows seaward through the various channels.

Loetoer (Lutur), about $1\frac{1}{2}$ miles south-westward of Djedan, has a small round-topped tree on its northern side, which projects just above the surrounding trees. Santigi, lying on the fringing reef on the south-eastern side of Loetoer, is a group of mangrove islets. Soerat (Surat), $1\frac{1}{2}$ miles southward of Djedan, is a bare sand patch above water. The sandbank on the northern extremity of the drying bank which extends northward from Tapoesoer, situated 2 miles south-westward of Loetoer, dries about 3 feet (0^m9).

Kola Watoe is a fairly deep channel with no dangers in the fairway, but reefs extend from either shore in places, and are usually marked by discoloration. The entrance from westward is easy to navigate; Tiga eilandjes (*Lat. $5^{\circ} 25' S.$, Long. $134^{\circ} 31' E.$*), three rocky islets covered with vegetation, on the northern side of the passage, are a good mark. The entrance from northward is through Kliplip Watoe, close along the south-eastern side of Wariloe; this channel, however, has not been thoroughly surveyed.

The entrance to Kola Watoe from eastward leads along the southern side of Djedan eilanden, through the eastern outlet of the deep channel which separates the plateau on which the Djedan eilanden lie from Wariloe and the islands south-eastward of it, which latter are covered with high vegetation; the northern part of this channel has not been thoroughly examined. This eastern outlet can be approached from seaward by sounding, and thence by keeping Soerat in line with the southern extremity of Loetoer, bearing about 278° . The channel southward of Tapoesoer is only available for praus. In the channel between Tapoesoer and Lافoesa, three-quarters of a mile north-westward, there is a least depth of 23 feet (7^m0).

WESTERN SIDE OF AROE EILANDEN.—With the exception of the southern part of Trangan, which is hilly with fairly steep sides, the western side of Aroe eilanden is a monotonous stretch of thickly wooded land. There are no conspicuous objects, so that a vessel must rely for fixing her position on the mouths of the various rivers and points, which necessitates being fairly close offshore. Anchorage may be obtained in depths of over 5 fathoms (9^m1) everywhere. Sounding is a good guide, even in the southern part, where the depths are irregular. In depths of over 5 fathoms (9^m1) the bottom is sandy, with mud in places, but within this depth there is reef formation.

Coast.—Danger.—Boear (Buar), an island separated from the north-western extremity of Kola by a shallow channel, is, like that island, low and covered with vegetation. It is fringed by a reef which extends about one mile from its western and northern sides. A detached shoal, with a depth of 11 feet (3^m4), lies 2 miles south-westward of Boear.

Charts 942b, 2759a.

Chart 470.

Sungei Sisir Watoe is the passage between Kola and Wokam ; the western entrance, which lies about 5 miles southward of the north-western extremity of Kola, is narrow and tortuous, and in which the tidal streams are strong.

Off-lying islands.—Wasir and Oedjir (Ujir), situated about 11 miles west-south-westward and $9\frac{1}{2}$ miles south-westward, respectively, of Boear, are higher in the northern than the southern part. Along the western side of Wasir, which can be closely approached, 10 are four large rocks, covered with vegetation, the northernmost of which can be identified from a considerable distance.

A bank, with a depth of $8\frac{1}{2}$ fathoms (16^m0), lies about $3\frac{1}{2}$ miles northward of Wasir.

A small sandbank above water lies on the reef, which dries, extending 15 from the western side of Oedjir nearly one mile south-south-westward of Tanjong Toetoeapano (Tutupano) (*Lat. $5^{\circ} 37' S.$, Long. $134^{\circ} 14' E.$*).

Straat Wasir, between Wasir and Oedjir, is navigable by vessels of shallow draught ; there are two reefs at its northern end, with depths of $2\frac{1}{2}$ and 3 fathoms (5^m0 and 5^m5), and a reef, with a depth of 3 feet 20 (0^m9), lies $1\frac{1}{2}$ miles northward of the north-eastern point of Oedjir.

The channel between Oedjir and Wokam is dangerous. A reef, with a depth of $2\frac{1}{2}$ fathoms (4^m6), lies on the southern side of the fairway, about one mile eastward of Tanjong Samang, situated about $1\frac{1}{2}$ miles south-westward of the southern extremity of Oedjir, and about 5 miles 25 farther north-eastward there is a line of reefs, which mostly dry, lying across the fairway and almost closing it, leaving a passage half a mile wide, with a depth of 6 fathoms (11^m0). One of these reefs, near the middle of the channel, has a patch on it which is above water. This channel should only be used at low water as the reefs do not always 30 show by discoloration.

To enter from westward a vessel should keep close to the Oedjir shore, and when the southern extremity of that island bears 000° , she should steer for the small above-water sandbank, which is plainly visible, about 2 miles from the south-eastern side of Oedjir, and when 35 nearing it alter course to pass between it and a small drying reef north-westward of it, thence the channel becomes wider.

Coast.—The coast of Wokam between Tanjong Samang and Tanjong Malakafani, about 4 miles south-south-westward, can be approached fairly closely.

40 *Chart 470, plan of Dobo harbour.*

Reede Dobo.—**Lights.**—**Beacon.**—**Buoys.**—The limits of this roadstead, which lies between the coast of Wokam and the north-eastern side of Wamar, are imaginary lines drawn 045° from Tanjong Oelar, the north-western extremity of Wamar, and 225° from Tanjong 45 Meroekoedjoering (Merukujuring), situated $3\frac{1}{2}$ miles south-eastward of Tanjong Malakafani.

Wamar is a low island thickly covered with vegetation, fringed by a reef which dries. There are three conspicuous rocks on the fringing reef about three-quarters of a mile southward of Tanjong Oelar (Ular), 50 and there are two similar rocks close off Tanjong Batoe Doea (Batu Dua) (chart 470), the south-western point of the island.

The least depth on the leading line in the western entrance is 6 fathoms (11^m0).

A light is exhibited, at an elevation of 70 feet (21^m3), from a white

Chart 470, plan of Dobo harbour.

iron framework structure, 43 feet (13^m1) in height, on Tanjong Oelar.

A light is exhibited from a post on the head of the pier at Dobo.

A white conical buoy is moored on the southern side of the fairway, about 1½ miles eastward of Tanjong Oelar. 5

A white iron beacon, surmounted by a ball over a black screen, stands on the shore reef on the southern side of the fairway, about 5½ cables west-north-westward of the light post at Dobo.

There is a mooring buoy, for the use of local vessels, situated about 10 1½ cables eastward of the light post at Dobo.

Tidal streams.—Outside the entrance to Reede Dobo the tidal streams set southward with the rising tide and northward with the falling tide. During the South-east monsoon the in going stream is weak, but the out-going stream attains a rate of 1½ knots, and is some- 15 times much stronger off Dobo.

Directions.—Approaching from westward, four openings in the coast will be seen from a considerable distance, the third from northward being the entrance to Reede Dobo. On closing the land, the lighthouse on Tanjong Oelar (*Lat. 5° 45' S., Long. 134° 11' E.*) and the 20 wireless masts at Dobo will be seen. A vessel should enter with the flagstaff at Dobo, or, if this cannot be distinguished, the northernmost building, which is a large black shed with a zinc roof, in line with the white beacon, bearing 116°, which leads over the southern extremity of the bank extending from Tanjong Malakafani. The beacon is some- 25 times difficult to identify. When the light-structure on Tanjong Oelar bears 220° the vessel should steer 101° until Tanjong Fanadjoering (Fanajuring), situated about 5 miles south-eastward of Tanjong Malakafani, is seen midway between Dobo and Tanjong Meroekoedjoering, bearing 115°, which leads to the anchorage. The reefs on 30 either side may not be marked by discoloration.

Dobo.—The town of Dobo is situated on the northern side of Wamar, about 2½ miles eastward of Tanjong Oelar. It is the principal place in the Aroe eilanden and is the headquarters of a Government official. 35

Some provisions may be obtained. There is a hospital in the town.

W/T. station.—There is a W/T station at Dobo. See page 10. *Chart 470.*

Coast.—The north-eastern part of the bay, entered between Tanjong Malakafani and Tanjong Fatoedjoering (Fatuuring), about 40 18 miles south-south-westward, is encumbered with dangers. Shoals, the outer of which has a depth of one fathom (1^m8), lie within 3 miles west-south-westward of Tanjong Toardefete, situated about 8 miles south-south-westward of Tanjong Fanadjoering. Babi, a low islet, covered with high vegetation, lies 7 miles westward of Tanjong Toarde- 45 fete; three rocks lie on the fringing reef, which dries, on the south-western side of the islet.

Sungei Manoembai and Sungei Workai are entered about 5½ and 7½ miles, respectively, southward of Tanjong Toardefete, and afford navigable channels for vessels with local knowledge to the east coast 50 of Aroe eilanden.

Sungei Manoembai.—Sungei Manoembai (Manumbai) is about 28 miles long and has a least depth of 3 fathoms (5^m5); it is the principal passage through the islands. The channels from its eastern

Chart 470.

entrance to seaward have not been thoroughly examined (*see* page 169). With the rising tide the tidal streams set into both ends of the channel and with the falling tide set out, and may attain a rate of 5 from $1\frac{1}{2}$ to $2\frac{1}{2}$ knots in the entrances.

In the approach to the western entrance of Sungei Manoembai there is a bank with a least depth of $2\frac{1}{2}$ fathoms (4^m6), but there is a channel northward and eastward of it with a least depth of $3\frac{1}{2}$ fathoms (5^m9), leading into the entrance. A reef, which dries, extends south-west-
10 ward from Tanjong Belingaratoe, the northern entrance point of Sungei Manoembai, and should be given a good berth. On the southern side of the entrance is Manoembai village (*Lat.* $6^\circ 02' S.$, *Long.* $134^\circ 17' E.$), off which there is a rock covered with light green vegetation, which is a good mark and can be passed close-to. Close east-
15 ward of the village there is a conspicuous white rocky patch, in the vicinity of which the shore is rocky. About 3 miles eastward of the village there is a bight on the southern side, in which there are two islets thickly covered with vegetation.

A vessel, after entering, should keep in mid-channel as far as this
20 bight, thence the greatest depths, from 5 to $5\frac{1}{2}$ fathoms (9^m1 to 10^m1), are close to the northern shore until past the mouth of Sungei Marirremaar, about 4 miles eastward of Manoembai village; elsewhere, except in the entrance, the depths are over $5\frac{1}{2}$ fathoms (10^m1), and the channel is clear of dangers. After passing the entrance to Sungei Marirremaar,
25 a waterfall will be seen about 3 miles farther, on the northern shore; near the entrance to Sungei Api Api, on the southern shore, about 4 miles east-north-eastward of Sungei Marirremaar, there is a conspicuous hillock. There is another conspicuous hillock, covered with vegetation and with a conspicuous tree on it, on a point on the southern
30 shore, situated just westward of the position where the river trends eastward for a short distance about 2 miles farther. Rocks lie close to both shores in places.

About $1\frac{1}{2}$ miles westward of the mouth of Sungei Dosi, in which there are some islets, about 9 miles east-north-eastward of Sungei
35 Api Api, there is a rock which dries, which should be passed on its northern side. After passing the mouth of Sungei Féraun, on the northern shore, about 2 miles east-north-eastward of Sungei Dosi, this shore should be kept aboard, but subsequently the southern shore should be closed by crossing between drying mudbanks in a least
40 depth of 3 fathoms (5^m5).

Sungei Workai.—This channel, which separates Kibroör from Maikoör, is available for vessels of heavy draught as far as Njamöek (Njamuk), about 4 miles within the western entrance, but thence to the eastern entrance there is a least depth of 16 feet (4^m9), but in this
45 entrance there is only a depth of 5 feet (1^m5). The narrowest part is at Ajer Boenga Radja (Ajer Bunga Raja), about 8 miles south-eastward of Njamöek.

For the north-eastern approach to Sungei Workai, *see* page 170.

Coast.—Between Tanjong Fatoedjoering and the northern entrance
50 point of Sungei Maikoör, about 8 miles southward, the coast is low, thickly covered with vegetation, and bordered by a narrow sandy beach. Several shoals, with depths of $3\frac{1}{2}$ and 5 fathoms (6^m9 and 9^m1), lie about $2\frac{1}{2}$ miles off this stretch of coast, the positions of which may best be seen on the chart.

Chart 470.

The entrance to Sungei Maikoör (Maikur), between Maikoör village and Tanjong Ngoni, about 3 miles south-westward, is deep in the fairway and continues so until just above Taberfane village, on the southern shore about $2\frac{1}{2}$ miles within Tanjong Ngoni. A rock, which dries and is very steep-to, lies in the middle of the fairway off Taberfane. Sounding is a good guide when entering. The channel above this village appears to be deep, but is too narrow for vessels. 5

Off-lying dangers.—Between Tanjong Ngoni (*Lat. $6^{\circ} 10' S.$, Long. $134^{\circ} 05' E.$*) and the entrance to Sungei Serwatoe, about 17 miles southward, the coast is fronted by a number of reefs and shoals. Batavia riffen, consisting of two patches, with depths of $2\frac{1}{2}$ and 3 fathoms (4^{m6} and 5^{m5}), lie about 9 miles southward of Tanjong Ngoni and about 5 miles offshore. Shoals, with depths of from $3\frac{1}{2}$ to 6 fathoms (6^{m9} to 11^{m0}), lie about $8\frac{1}{2}$ miles offshore westward of these reefs, and a 5-fathom (9^{m1}) patch lies about 6 miles westward of Tanjong Fatoerei, situated about 15 miles southward of Tanjong Ngoni. 10 15

Sungei Serwatoe.—This passage, entered close northward of Tanjong Deréhi, nearly 2 miles southward of Tanjong Fatoerei, extends to the east coast of Trangan. A channel, about $2\frac{1}{2}$ cables wide, with a least depth of $2\frac{1}{2}$ fathoms (5^{m0}), leads into the entrance over a bank, with depths of less than 3 fathoms (5^{m5}), which extends about $2\frac{1}{2}$ miles offshore northward of the entrance. This channel is reported to shift owing to the influence of the monsoons. In 1907, a vessel with a draught of 6 feet (1^{m8}), and 75 feet (22^{m9}) in length, proceeded as far as the entrance to Sungei Loloor, about 8 miles from the entrance. 20 25

Coast.—The coast between Tanjong Deréhi and Ngaibor village, about 16 miles southward, is low, rising inland gradually and overgrown with reeds. Ngaibor, which is the largest village on the west coast of Trangan, stands conspicuously on a small plateau. Close northward of it is Sungei Ngaibor, the largest fresh-water river in the Aroe eilanden; it is about 75 yards (68^{m6}) wide at its entrance, and in the rainy season overflows its banks. Southward of Ngaibor the coast becomes rocky, but continues low as far as Tanjong Lelar, about 4 miles farther southward. 30 35

Off-lying dangers.—Several 5-fathom (9^{m1}) patches lie within $4\frac{1}{2}$ miles of the coast just southward of Tanjong Deréhi. A number of shoals, with depths of from $3\frac{1}{2}$ to 6 fathoms (6^{m4} to 11^{m0}), lie within $6\frac{1}{2}$ miles of the coast between Tanjong Deréhi and Tanjong Lelar; their positions can best be seen on the chart. 40

Coast.—Between Tanjong Lelar and Tanjong Bain, about 5 miles south-south-eastward, and thence to Tanjong Ngabordamloe, about 8 miles farther south-eastward, the coast is rocky and steep, but is not high. The coastal reef between the two former points extends about three-quarters of a mile offshore, with a depth of about 2 feet (0^{m6}). Bain, a hill, 295 feet (89^{m9}) high, about $2\frac{3}{4}$ miles north-eastward of Tanjong Bain, and the mouth of Sungei Tafermaar, about $3\frac{1}{2}$ miles eastward of the same point, are conspicuous, although Bain is only slightly higher than the land in its vicinity. 45

An islet, 120 feet (36^{m6}) high, and about the same height as Tanjong Ngabordamloe, lies on the drying reef which fringes that point. Batu Gojang, a grey bare rock, about 33 feet (10^{m1}) high, lies on the outer edge of the same reef, and close eastward of it there is a rock which dries about 6 feet (1^{m8}). A reef, with a depth of $1\frac{1}{2}$ fathoms (2^{m7}), 50

Chart 470.

lies $1\frac{1}{2}$ miles south-south-eastward of Tanjong Ngabordamloe (*Lat.* $6^{\circ} 56'$ S., *Long.* $134^{\circ} 11'$ E.). The depths in the vicinity of this point are very irregular. The tidal streams are strong, there are heavy
 5 tide-rips and usually a high sea. For further details of the streams, see page 160.

Off-lying dangers.—Blackburn bank, with a least depth of about 7 feet (2^m1), lies about $7\frac{1}{2}$ miles west-south-westward of Tanjong Bain; it is frequently marked by breakers. Several patches, with
 10 depths of 5 fathoms (9^m1), lie within 8 miles southward of the shoalest part of Blackburn bank.

EASTERN SIDE OF AROE EILANDEN.—Coast.—There are no conspicuous objects on the eastern side of Aroe eilanden; the whole coast appears as one uniform stretch of land, and the off-lying
 15 islands are difficult to identify from a distance.

Djedan eilanden, off the north-eastern side of Kola, have been described on page 161. The eastern coast of Kola is rocky for a great part, and thickly covered with vegetation. Marlassi village is situated about $2\frac{1}{2}$ miles southward of the north-eastern extremity of Kola, and
 20 close northward of the village is the mouth of the river of the same name. Masidan village stands on a rock on Tanjong Leitin, about $2\frac{3}{4}$ miles south-eastward of Marlassi; from seaward these villages appear as light red patches. About $1\frac{1}{2}$ miles southward of Tanjong Leitin, there were, in 1894, two conspicuous trees.

25 Shoals, which dry, extend from 4 to 6 miles eastward from Koeloer (Kulur), an island lying close off the coast of Kola just southward of its north-eastern extremity and from the coast southward of it. The coast cannot be approached within 6 miles in this vicinity except through the channels in the reef, owing to the coastal reef and an
 30 extensive drying reef outside it. Several islands, thickly covered with vegetation, of which Binaar, 2 miles southward of Tanjong Leitin, is the largest, lie on the coastal reef between Sungei Marlassi and Sungei Sisir Watoe, about 6 miles southward.

Off-lying islets and dangers.—Konan, a sandy, atoll-shaped islet, covered with vegetation, lies about $4\frac{1}{2}$ miles eastward of Binaar, on an extensive reef which dries, between which and the coast there is a channel; two rocks, covered with vegetation, lie on the reef close to the islet. Konan from a distance northward or southward, appears as two trees showing above the horizon.

40 Arar Koela, lying about 2 miles southward of Konan, is a coral and mud bank, partly above high water, with some low trees on it; it is separated from the reef extending from Konan by a narrow winding channel, and from the coast of Wokam by a fairly wide channel, with depths of from $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms (6^m4 to 8^m2), the southern entrance of
 45 which, however, is foul. Eastward of Arar Koela, the reef extends 2 miles, and, $3\frac{1}{2}$ miles east-south-eastward of the islet, is a detached reef, over which there is a depth of 2 fathoms (3^m7), which is sometimes marked by slight discoloration. The channels northward and southward of Arar Koela are used as the entrances to Sungei Sisir Watoe,
 50 which is a means of communication for small craft between the eastern and western coasts.

Coast.—The coast southward of the entrance to Sungei Sisir Watoe is, like that northward of it, thickly covered with vegetation and is

Chart 470.

rocky, as far south as Tanjong Komfane (*Lat. 5° 39' S., Long. 134° 44' E.*), near the village of that name, about $6\frac{1}{2}$ miles south-eastward. There are several villages on this stretch of coast, of which Moha is the principal; they stand on rocks, and, like other villages on this coast, appear as light red patches. Kootbaai (Kutbaai), an islet lying on the coastal reef about a mile offshore eastward of Moha, is a good mark from south-eastward. Ikagoeri, an islet about three-quarters of a mile southward of Kootbaai, is difficult to distinguish from the land behind it.

The point lying one mile southward of Tanjong Komfane can be seen from a great distance from northward or southward, appearing then as several separate islands, owing to the gaps in the trees. On it is a group of high trees, the highest of which, with a hammer-shaped top, is conspicuous from eastward or south-eastward. Southward of this point is Maloemdidim, a wooded islet, and the islands of Wodinhoen and Wahalaulau.

Watoelai eilanden.—This group consists of a large number of rocky islands lying on an extensive reef, through which a few narrow channels give access to the numerous villages. The principal islands are Adoeâr, Koemoel (Kumul), Watoelai and Tabar. Djoersian (Jursian), with the adjacent islands, farther southward, are also considered as belonging to the group. Adoeâr, Koemoel, Watoelai and Djoersian are inhabited.

Rewan, the north-easternmost of the group, situated about 5 miles south-south-eastward of Tanjong Komfane, consists of three islets lying close together, of which the south-western is the highest, whilst the other two are only slightly covered with vegetation; it is difficult to distinguish against the high land of Adoeâr. A bare rock, above water, lies on the reef south-westward of Rewan. Manien, about half a mile westward of Rewan, is thickly covered with vegetation; its western side is rocky and higher than the eastern; there is a sandy beach on the latter side.

Adoeâr, the highest of the group, is covered with high trees. There are several fairly large villages on the island. A mound, covered with vegetation, lies on the southern side. A channel through the reef, with a depth of about 10 feet (3^m0) in the entrance, gives access to the villages. Ilmamoei, about 3 cables southward of Adoeâr, is lower than that island, and covered with vegetation. Ngoab, about 6 cables south-eastward of Ilmamoei, is a rocky islet covered with low trees; it is rendered conspicuous by two isolated coconut trees.

Koemoel, about 3 cables southward of Ilmamoei, is thickly covered with vegetation. The south-eastern side of the island, on which there is a village of the same name, terminates in a narrow, bare, rocky tongue of land, which, from seaward, appears as a conspicuous light patch with a small clump of coconut trees on its northern side.

Watoelai, about one mile south-south-eastward of Koemoel, has a bare patch on its northern side, similar to that on Koemoel. Watoelai village is situated on the north-eastern side of the island. About three-quarters of a cable north-westward of the village there is a conspicuous clump of trees, the top of which has an elevation of 150 feet (45^m7), which is a good mark for navigating the narrow channel through the reef leading close to Koemoel and Watoelai villages. Tabar, close westward of Watoelai, is thickly covered with vegetation.

Chart 470.

Ellel (*Lat. 5° 50' S., Long. 134° 48' E.*), Menlae and Mentai are rocky islets covered with vegetation, lying on the reef within $1\frac{1}{2}$ miles south-eastward of Watoelai. A small clump of coconut trees stands on the north-eastern point of Menlae, and there is a village on the north-western side. Mentai, the south-easternmost of the three islets, has the appearance of a plume. Ramje, Korlé, and Waria are rocky islets covered with vegetation, which partly obstruct the entrance to the inlet westward of Tabar. On the north-eastern point of Waria is the village of the same name, reached by a tortuous channel in the reef, leading southward of Mentai.

Djoersian (Jursian) group consists of several rocky islands, thickly covered with vegetation, in which there are a number of deep inlets. The northern extremity of Djoersian is the only good mark in the group which can be identified from seaward, and on a rock close to it is Djoersian village.

Directions.—About $2\frac{1}{2}$ miles north-eastward of Watoelai, is the entrance to a narrow, but fairly deep channel, leading south-westward and westward towards Koemoel and Watoelai villages. The outer edge of the reef can be approached safely by constant sounding, and the best anchorage in the entrance to the channel is in a depth of 4 fathoms (7^m3); with the northern point of Koemoel in line with Ngoab, bearing about 267° and the western of the two Maar eilandjes (page 169) in line with the eastern extremity of Menlae bearing about 194° . By keeping on the northern side of the channel until the eastern point of Groot Karaweira is in line with Mentai, bearing about 166° , and then on the southern side, depths of not less than 17 feet (5^m2) will be maintained. When the west point of Groot Karaweira is in line with the eastern extremity of Menlae, bearing about 168° , varying depths will be found, but not less than 14 feet (4^m3). The channel is only three-quarters of a cable wide in some places and after abandoning the leading mark, runs in a south-westerly direction and becomes wider. The tidal streams run with great strength at springs, especially on the out-going stream.

Karaweira eilanden.—This group consists of 13 uninhabited islands, which may be divided into two parts, the Karaweira Watoelei and Karaweira Mariri; to the former belong Groot Karaweira and Sabir, both situated on the same drying reef; the Karaweira Mariri, the southernmost of which is Dorlae, lie at the southern end of the group.

Groot Karaweira, about 5 miles south-eastward of Djoersian, is 243 feet (74^m1) high to the top of the trees and is the highest land on the east coast of the Aroe eilanden; it is, like the other islands, rocky, thickly covered with vegetation, and bordered with large rocks; on one of these there are a few fishermen's huts. The highest tree is very conspicuous from between north-east and east, as its top resembles a cross.

Sabir, a low islet, lies on the edge of the reef about three-quarters of a mile eastward of Groot Karaweira; there is a small sandy inlet on its north-western side. The islet is divided into two parts by a ravine, and thus appears as two islets from a distance. A rock, above water, resembling a lion lying down, lies near the south-eastern point. Some sandbanks, which dry about 3 feet (0^m9), lie on the coral reef on which both Groot Karaweira and Sabir are situated; this reef

Chart 470.

appears to extend westward as far as Maar eilandjes. Some low isolated trees stand on the southern part of the reef surrounding Karaweira Mariri.

Maar eilandjes (*Lat. 5° 57' S., Long. 134° 47' E.*) are two rocky islets, of which the western is the higher, lying about $3\frac{1}{2}$ miles westward of Groot Karaweira. The eastern islet appears from a distance as two islets, which are connected by an above-water arch, forming a natural bridge.

Approaches to Sungei Manoembai.—Dangers.—The usual channel from northward leading to the entrance of Sungei Manoembai passes about $1\frac{1}{2}$ miles outside Djoersian in a west-south-westerly direction, thence turning southward and passing between the Maar eilandjes; thence it leads between the reef extending from the Karaweira eilanden on the east and that extending from Wokam on the west. There is a least depth of $3\frac{1}{2}$ fathoms (5^m9) in this channel, 2 miles southward of Maar eilandjes.

The entrance to this channel is bounded on the eastern side by the narrow, sandy northern extremity of an extensive coral reef, situated about $2\frac{1}{2}$ miles eastward of Mentai, with depths of from 8 to 15 feet (2^m4 to 4^m6), the eastern side of which can be approached by sounding. A channel leading southward, with depths of from $2\frac{3}{4}$ to 5 fathoms (5^m0 to 9^m1), separates this reef from the shoals which surround the Karaweira group. Anchorage may be obtained by vessels with local knowledge, in a depth of 5 fathoms (9^m1), mud and coral, in the entrance to the channel about $3\frac{1}{2}$ miles from Djoersian village.

Batu Kapal, situated in the south-eastern approach to Sungei Manoembai, about $2\frac{1}{2}$ miles south-south-westward of Dorlae, is a fairly high rock partly covered with vegetation, and when seen clear of the Kobroër coast, is a good mark. The rock is held sacred by the natives, who make offerings to it. There is foul ground on the northern and eastern sides, and the tidal streams are strong. A small atoll-shaped sandbank, above water, lies about 3 miles south-south-eastward of Dorlae.

There are channels which lead northward and southward of this sandbank and thence southward of Batu Kapal to the mouth of Sungei Manoembai. In the northern channel there are depths of from $6\frac{1}{2}$ to 11 fathoms (11^m9 to 20^m1), and off its entrance the tidal stream sets southward with the rising tide, and east-north-eastward with the falling tide. There is a conspicuous white bare trunk of a tree on Leliling, an islet situated close northward of Warloi village, on the east coast of Kobroër, about $7\frac{1}{2}$ miles south-westward of Batu Kapal.

With Dorlae bearing between 292° and 338° , the southern side of the channel is determined by means of the danger angle of 86° between Batu Kapal and the highest point of Sabir, and vessels should not close to within this arc, but a danger angle of 81° leads well clear of the southern side.

In the southern channel, northward of the reef extending from Mariri are several detached coral patches, with depths of $2\frac{1}{2}$ and 3 fathoms (4^m6 and 5^m5). A danger angle of from $29\frac{1}{2}^\circ$ to $31\frac{1}{2}^\circ$ between Batu Kapal and Dorlae will avoid these patches. The use of the angle is discontinued when the white tree on Leliling bears 236° . Southward of Batu Kapal there is good anchorage, mud and sand bottom. Westward of Batu Kapal, the channel is not surveyed.

Chart 470.

For description of Sungei Manoembai, *see* page 163.

Mariri eilanden.—This group, consisting of Mariri (*Lat. 6° 09' S., Long. 134° 51' E.*) and Leer and several islets, of which Lola, the southernmost, is the most important, lie about 6 miles from the coast of Kobraör. They are to a great extent planted with coconut trees.

Mariri, about 7 miles southward of Dorlae, has, on its northern side, two conspicuous trees, the tops of which have an elevation of 164 feet (50^m0), projecting above the surrounding wood, visible from north-eastward and south-eastward. Mariri village stands on one of the islets close off the south-eastern extremity of Mariri, and is plainly visible.

Anchorage may be obtained by vessels with local knowledge, in a least depth of 3½ fathoms (6^m9), about three-quarters of a mile offshore, with the village bearing 264°.

Leer, about 1½ miles south-south-westward of Mariri, is thickly covered with vegetation, and can be identified by the considerable quantity of dead wood on it. Approaching from south-eastward it will be sighted about the same time as Mariri. On Lola there is a conspicuous village near an isolated clump of coconut trees on its southern extremity.

North-eastern approach to Sungei Workai.—The south-eastern entrance of Sungei Workai, situated at the southern extremity of Kobraör, is approached by a channel from north-eastward with very irregular depths leading between Lola and the northern end of Penamboelai, about 3 miles southward.

A vessel approaching this channel should steer for the sandy eastern entrance point of Sungei Kangoerma, situated at the northern end of Penamboelai, bearing 210°, until the south-western extremity of Mariri is in line with Sedja, the southern of the two islets close off the north-eastern extremity of Leer, bearing about 344°. Djarang (Jarang), an islet lying about 1½ miles from the coast of Kobraör, about 3 miles southward of Leliling, will then be open south-westward of Lola, bearing about 296°.

The rate of the tidal streams here is sometimes 3 knots, setting offshore with the falling tide, and southward with the rising tide. Thence the vessel should make good a course 242° until Epar, the double islet about 1½ miles westward of the northern extremity of Leer, is open south-westward of Lola, bearing about 330°, when she should make good a course 269°, which will lead to the anchorage about 2 miles southward of Lola village, where there are depths of from 5½ to 6 fathoms (10^m1 to 11^m0), sand, mud and coral.

For description of Sungei Workai, *see* page 164.

Off-lying islands.—Penamboelai, Barakan, close southward of it, and Workai, 3½ miles farther south-westward, are, except for a few small parts, where the coast is rocky, very low, but are covered with high trees. Mimien, Wolvat, Lelamtoeti, and Baoen, islands lying between this group and the coast, have only been cursorily examined.

A clump of high trees, the top of which has an elevation of 164 feet (50^m0), stands close northward of Rabal village, on the east coast of Penamboelai, about 3 miles south-south-westward of Tanjong Oeafie Fendjoering (Uafu Fenjuring), the north-eastern extremity of the island; there are some conspicuous high trees on the latter point, which is bordered by a sandy beach. There is a small, but conspicuous

Chart 470.

tree on Tanjong Ki (*Lat. 6° 27' S., Long. 134° 50' E.*), about 5 miles south-south-westward of Rabal.

The rocky north-eastern point of Barakan is a useful mark when approaching from northward. Close northward of the south-eastern point and in the middle of the western side of the island, the vegetation is noticeably higher. 5

Several islands lie on the reef which surrounds Workai; this reef is steep-to on its eastern side. Toertoer Djoering (Turtur Juring), one of these islands, situated close off the north-eastern side of Workai, is thickly covered with vegetation and is moderately high; the eastern extremity can easily be identified from northward, as it appears as a knob. There is a sandy beach on the north-eastern side of the island. 10

Koeltoebai-Noord (North Kultubai), consisting of three small islets on which there are clumps of trees, of which the easternmost islet is the largest, lies on the drying coral reef extending about $4\frac{1}{2}$ miles southward from Toertoer Djoering; there is also a small sandbank above water on this reef. From southward these clumps of trees are difficult to identify against the higher land of Toertoer Djoering, but from northward they are plainly visible, and the easternmost then appears as two trees on the horizon. 20

There is a convenient roadstead southward of Koeltoebai-Noord, in the inlet in the extensive reef. In 1893, there was a conspicuous sacrificial post on the southern side of the roadstead, on the edge of the drying reef extending north-eastward from the Djin eilanden (Jin islands). 25

SOUTHERN SIDE OF AROE EILANDEN.—Djin eilanden.—

This group, lying on the extensive drying reef southward of Workai, consists of six sandy islands, most of which are very low, and to some extent inhabited. 30

Koeltoebai-Zuid (South Kultubai), the easternmost of the group, appears at some distance from northward and southward as two islands owing to a gap in the trees. Near the western extremity, there were, in 1893, two conspicuous trees standing close together westward of the higher trees, but they were not visible when bearing between 203° and 338° . There are some shrubs on the reef northward of the island. 35

Maardjindjin (Maarjinjin), close westward of Koeltoebai-Zuid, can be identified by a conspicuous tree with a V-shaped top, on the southern side. Djeoedin (Jeudin), the next island westward, has, on its south-eastern side, a remarkable tree, the top of which from southward appears like a church with a square tower. Mar and Djeh (Jeh), south-westward of Djeoedin, are low uninhabited islets, and are densely covered with vegetation, except the south-eastern point of Djeh, which has a few isolated trees on it. The channel between these two islands has a depth of $3\frac{1}{2}$ fathoms (6^m9) and is clear of dangers in the 45 fairway, but the tidal streams in it are strong.

Islands and dangers southward of Djin eilanden.—Karang (*Lat. $7^{\circ} 01' S.$, Long. $134^{\circ} 39' E.$*), a low and uninhabited island, thickly covered with vegetation, lies about $7\frac{1}{2}$ miles south-south-westward of Maardjindjin. A 2-fathom (3^m7) patch lies about $3\frac{1}{2}$ miles east-north-eastward of Karang, and a 3-fathom (5^m5) patch lies about $4\frac{1}{2}$ miles northward of the island.

Enoe (Enu), a low and uninhabited island, thickly covered with

Chart 470.

vegetation, lies about $8\frac{1}{2}$ miles west-south-westward of Karang. A shoal, with a least depth of $2\frac{1}{2}$ fathoms (5^m0), lies about $2\frac{1}{2}$ miles south-south-westward of the south-western extremity of Enoe. Between
 5 Enoe and the south-eastern side of Trangan there are a number of shoals with depths of from $2\frac{1}{2}$ to 5 fathoms (4^m6 to 9^m1), the positions of which may best be seen on the chart.

South-eastern side of Trangan.—Dangers.—Beacons.—The south-eastern coast of Trangan is low. Two conspicuous trees stand
 10 about $9\frac{1}{2}$ miles north-eastward of Tanjong Ngabordamloe (page 165), and about 4 miles farther north-eastward is Tanjong Goldjoering (Goljuring).

Close northward of Tanjong Goldjoering is the entrance to Sungei Laelaemaar, which is about $2\frac{1}{2}$ cables wide, but narrows rapidly inside.
 15 South-eastward of Tanjong Goldjoering are two reefs which dry, on each of which is a sacrificial post, consisting of a small hut on piles, standing in the water, which are good marks. The villages of Oud Krei and Nieuw Krei stand on the coast about 4 and $6\frac{1}{2}$ miles, respectively, north-eastward of Tanjong Goldjoering.

20 Pendjoering (Fenjuring) is a group of low islets which appear as one large island, with rocky sides and thickly covered with vegetation, lying about 7 miles north-eastward of Tanjong Goldjoering. Between the extensive drying reef which connects this island with Mar, and the Trangan coast there are two moderately deep channels which lead to
 25 Oud Krei and Nieuw Krei.

The western channel leads close under the coast of Trangan, and is very narrow. It may be navigated by eye and by constant sounding at all states of the tide. Northward of Tanjong Goldjoering, the western side of the channel should be kept, to avoid a small drying reef
 30 eastward of Biltoboeer village, about $3\frac{1}{4}$ miles south-westward of Oud Krei.

The eastern channel, although wider, presents more difficulty, and is only practicable after half ebb, when the reefs are visible. It trends in a northerly direction, passing close westward of Djeh.

35 **Directions.**—The western side of the islet, southward of Koemnaar, about one mile southward of Nieuw Krei, in line with the eastern side of Karwai, an islet with some coconut trees on it, about 3 miles southward, bearing 349° , is an excellent mark for approaching the eastern channel; if the first-named islet is not visible, then the eastern side of
 40 Karwai should be steered for on that bearing. This is not always easy, as the tidal streams, sometimes strong, do not always set in the direction of the channel, being affected by some openings in the extensive drying reef around Pendjoering.

Care is required to avoid the shoal which extends from the drying
 45 reef westward of Wolil (*Lat. $6^\circ 50' S.$, Long. $134^\circ 28' E.$*), an islet lying about 5 miles south-eastward of Karwai; there is a small 6-foot (1^m8) patch here, which is very steep-to. Having passed it a vessel can navigate by eye between Karwai and the drying reef south-south-westward of it, thence northward towards the islet lying about half
 50 a mile eastward of Oud Krei.

Chart 942a.

TIMOR.—This island, the largest of the Kleine Soenda eilanden (Lesser Sunda islands), is described in "Eastern Archipelago Pilot,

Charts 942b, 2759a.

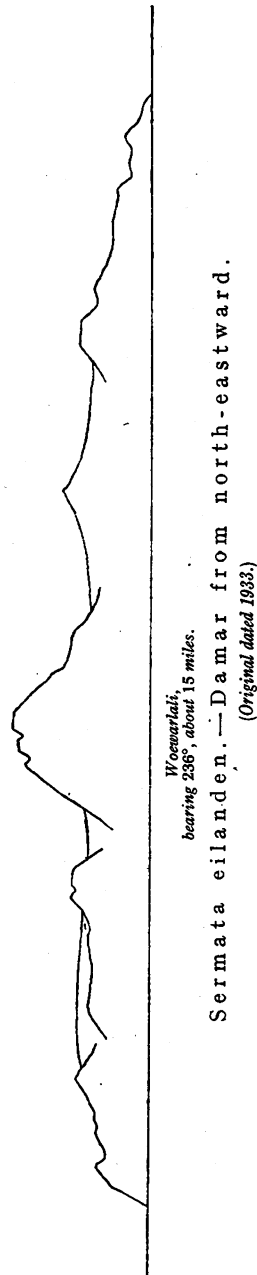
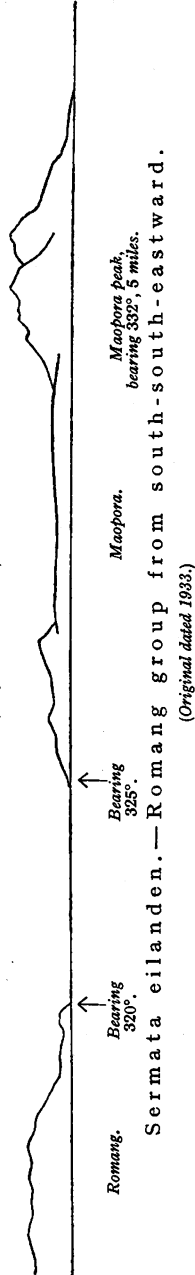
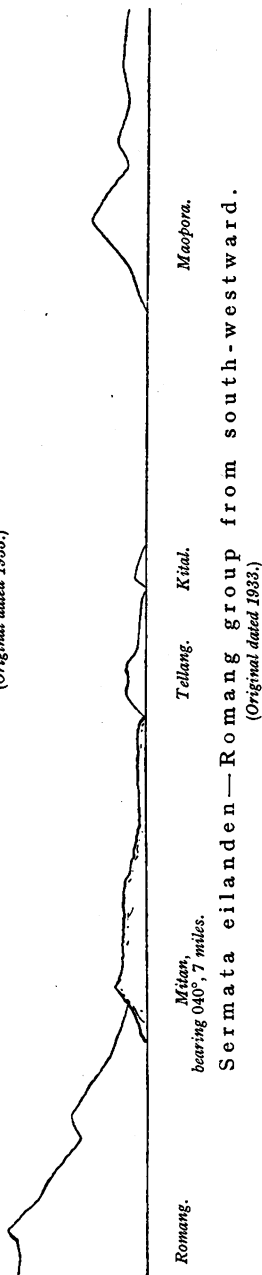
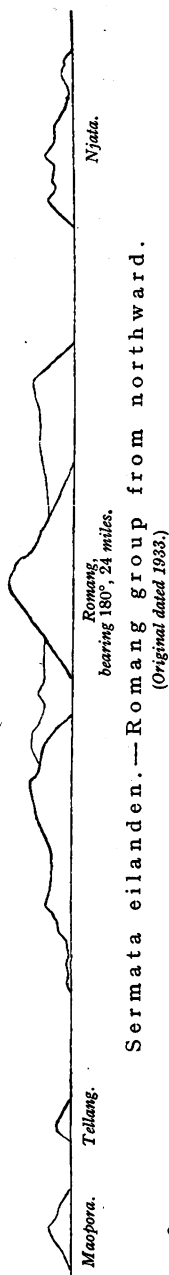
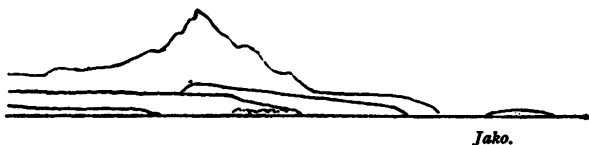


Chart 942a.

Vol. II. The eastern end is occupied by a fairly high, flat ridge of mountains, terminating in an almost perpendicular cliff about one mile within Tanjong Sewirawa, the eastern extremity of the island.

Pai Tekaoe Ile.*Jako.*

From Tanjong Soe Loro.—Pai Tekaoe Ile,
bearing 040° .

(Original dated 1933.)

Jako (Yako), a flat, uninhabited island 266 feet (81^m1) high, with 5 rocky coasts, lies close off Tanjong Sewirawa (Lat. $8^{\circ} 24' S.$, Long. $127^{\circ} 18' E.$).

Straat Jako, between Jako and Timor, is a clear channel, with a least width of about 3 cables, and can be safely navigated by keeping in mid-channel. The tidal streams may attain a rate of 4 knots at spring 10 tides; the direction changes regularly, but the north-going stream is of longer duration than the south-going. There are whirlpools in both entrances, and there is a troubled sea off the southern entrance during the South-east monsoon.

Charts 942a, b.

15

SERMATA EILANDEN.—These islands consist of two chains extending east-north-eastward and eastward, respectively, from Straat Wëtar (described in Eastern Archipelago Pilot, Vol. II) to approximately the meridian of $130^{\circ} E.$ The former chain consists of the Romang group and Damar eilanden, and the latter, Kisar, the Lëti 20 eilanden and Babar eilanden. All the islands are high and steep-to, and they have no known off-lying dangers.

Standard time.—See page 10. .

Chart 942a.

ROMANG GROUP.—This group, consisting of several hilly islands, 25 lies about 44 miles northward of Tanjong Sewirawa, the eastern extremity of Timor. The most prominent summits are those of Romang, Njata (Nyata), Tellang and Maopora. The channels between Romang and the adjacent islands, and also that between Maopora and Kital are deep and clear of dangers. See views facing this page. 30

Njata, the westernmost island of the group, is 1,033 feet (314^m9) high, and is fringed by a very steep-to reef, affording no anchorage.

Tidal streams.—Off the Romang group the tidal streams set northward with the rising tide, and southward with the falling tide. In the channels between the islands the streams run at a rate of from 35 $1\frac{1}{2}$ to $2\frac{1}{2}$ knots.

Romang.—Anchorages.—Romang is fringed by a steep-to reef, with depths of about 11 fathoms (20^m1) at its edge. There is a detached coral patch, with a depth of 5 fathoms (9^m1), about three-quarters of a mile off the northern coast, about 2 miles from the north-eastern 40 extremity of the island. The northern coast is rocky, interspersed with sandy beaches. Good anchorage may be obtained by vessels with local

Chart 2759a.

Chart 942a.

knowledge in Zwaan (Swan) baai, at the western end of the northern side of the island, and in the bights eastward of it. This bay can only be entered when the reefs are plainly visible; a vessel can then anchor southward of a small detached reef, which dries, in the middle of the bay, where there is sufficient room to swing with a radius of about 650 feet (198^m1).

The west coast is rocky except in the deep bight off the deserted village of Hila. Anchorage may be obtained northward of this village just northward of the rocky northern entrance point of the bight; the outermost houses of Hila should be just clear of the point, bearing 150°, and the vessel should anchor about 1½ cables from the relatively narrow coastal reef, in depths of from 16 to 22 fathoms (29^m3 to 40^m2), stones.

The southern and south-western coasts are the rocky edge of a moderately high plateau, which is separated from the higher north-eastern part by some lower land which is marshy in places. Anchorage may be obtained off the south coast, in depths of from 16 to 19 fathoms (29^m3 to 34^m7), sand and stones, off the sandy beach fronting a village, which was deserted in 1923, with the southern extremity of the island bearing 004°, and a conspicuous hut on the beach between this point and the south-western point of the island, 004°.

Chart 2465, plan of Rumah Kuda bay and Nusa Mitan.

On the east coast, which is mostly steep, there is a long sandy beach in Roemahkoeda (Rumah Kuda) baai, which continues northward as far as Djeroesoe (Jerusu) village (Lat. 7° 35' S., Long. 127° 28' E.), situated about 6 miles north-eastward of the southern extremity of the island. Good anchorage may be obtained in this bay about 1½ cables from the shore reef, with the mouth of the rivulet at Roemahkoeda village bearing 338°, and Tanjong Jenin Merah, 1½ miles eastward of it, 086°; the shore reef is plainly marked by discoloration.

Chart 942a.

Anchorage may be obtained by vessels with local knowledge about 4 miles north-eastward of Djeroesoe, abreast a conspicuous hut, situated at the southern entrance of the channel between Romang and Tellang; the vessel can anchor here during the West monsoon about 1½ cables from the coastal reef of Romang, in depths of from 16 to 22 fathoms (29^m3 to 40^m2), with the conspicuous hut bearing 281°, and the two points northward in line. During the survey the tidal streams here attained a rate of 1½ knots.

Mitan, 305 feet (93^m0) high, is an island covered with grey coral lime, lying about 2 miles south-eastward of the head of Roemahkoeda baai.

Eastern islands of Romang group.—Anchorages.—Tellang and Lintoetoe lie on the same reef about 3 miles eastward of the north-eastern part of Romang; the channel between Tellang and Lintoetoe dries.

Laoet, about half a mile north-north-eastward of Tellang, consists of a mass of rocks, and Kital, about the same distance south-eastward of Tellang, is separated from it by a deep and clear channel; it has a sandy beach. During the survey, in 1923, the stream through this channel was observed to run at a maximum rate of 2½ knots. A safe anchorage may be obtained by vessels with local knowledge, in a depth of about 12 fathoms (21^m9), sand and rock, between Tellang and Kital.

Maopora, about 6 miles eastward of Romang, is 1,017 feet (310^m0) high, at its northern end. The northern coast is rocky and steep; on

Chart 2759a.

Chart 942a.

the coastal bank, particularly on the 6-fathom (11^m0) patch, about three-quarters of a mile eastward of the northern extremity, there is a convenient anchorage, but there are very strong tide-rips in this vicinity. The east coast, especially towards the southern end, is 5 marshy. Good anchorage may be obtained in the channel between Maopora and Djoeha (Juha), where the depth is about 27 fathoms (49^m4). With the reefs clearly showing, this channel, which is about a cable wide, is easy to navigate. The stream here during the survey, was observed to have a maximum rate of 2 knots. The west coast of 10 Maopora consists almost entirely of fine sand beach, off which there is no anchorage.

Djoeha (Lat. 7° 35' S., Long. 127° 38' E.), a sandy islet situated about



a mile north-eastward of the eastern extremity of Maopora, is fringed 15 by a steep-to reef.

Charts 942a, b.

DAMAR EILANDEN.—This group includes Damar and off-lying islets, Teoen (Teun) and Nila, all hilly and steep-to, the peaks being conspicuous. There are no known off-lying dangers. The islands are inhabited.

20

Chart 942a.

Damar.—**Anchorage.**—This island, about 60 miles north-eastward of Maopora, is mountainous, with spurs extending to the coast. The north-eastern peninsula is predominated by Woewarlali, 2,848 feet (868^m1) high, which has four peaks. (See view facing 25 page 173.) At the western extremity of the island there are two regular cones, and at the southern extremity there is a peak, 1,529 feet (466^m0) high. The island is volcanic and in places steam and sulphur vapours are emitted. On the south-eastern side of Woewarlali there are some bare patches with lava. Earthquakes and disturbances of the 30 sea occur regularly.

Good anchorage may be obtained by vessels with local knowledge during the South-east monsoon, in Wilhelmus baai, on the north-eastern side of Damar. A vessel should approach the anchorage with the mouth of Ajer Kotta, situated on the south-western side of the bay, 35 bearing about 235°, with the anchor lowered about 35 fathoms (64^m0) from the bows; this approach will lead clear of the shore reefs. The walls of an old fort are situated in the village of Koemoer (Kumur), on the northern side of the river entrance.

Chart 3440, plan of Telok Solat or Kulewatti bay.

40

Telok Solat.—**Anchorage.**—This bay, on the eastern side of Damar, is free from dangers in the fairway. On the northern shore are the villages of Solat Kehli and Solat, the latter situated on the western extremity of a tongue of land extending westward, and on the southern shore is Woeloer village. The shore reef, except at the head of the bay, 45 where it mostly dries, nowhere extends more than about one cable;

Chart 2759a.

Chart 3440, plan of Telok Solat or Kulewatti bay.

off Solat Kehli it is marked by discoloration, but elsewhere it is not so clearly visible. There are some hot springs at Solat Kehli.

- Good anchorage may be obtained during the West monsoon, in a
 5 depth of about 27 fathoms (49^m4), with the boat pier at Solat bearing 000°. A vessel approaching the anchorage should not get too close to the northern shore, as the stream and swell set strongly on to it.

Chart 942a.

- Islands southward of Damar.**—Noord Terbang (*Lat. 7° 17' S.,*
 10 *Long. 128° 34' E.*), 466 feet (142^m0) high, and Zuid Terbang, 400 feet (121^m9) high, lie about 2½ miles apart, the former being situated nearly 6 miles south-westward of Tanjong Wotkoeam, the southern extremity of Damar. There is sometimes a strong stream in the passage between the two islands. A temporary anchorage may be obtained, in a depth
 15 of 39 fathoms (71^m3), near the southern extremity of Noord Terbang, with the 1,529-foot (466^m0) peak close northward of Tanjong Wotkoeam, showing midway between Tanjong Watlewantoetoe, the south-eastern point of Damar, and the south-eastern extremity of Noord Terbang. The depths increase rapidly just outside this position.
 20 Noes Leoer (Nus Leur) are two islets, 151 and 98 feet (46^m0 and 29^m9) high, lying close together on a coral reef, which is too steep-to for anchorage in its vicinity.

Charts 942a, b.

- Teoen.**—**Anchorage.**—Teoen (Teun), an island, 26 miles east-
 25 north-eastward of Damar, consists chiefly of an active volcano, 2,149 feet (655^m0) high, with a large crater just visible from northward, but not from southward; the last eruption occurred in 1904. There



Teoen, bearing 216°, 45 miles.

(Original dated 1933.)

- are several villages on the island, the most important of which is Lajoni (Layoni), on the south-western coast, off which a vessel with
 30 local knowledge may obtain anchorage, in a depth of 7 fathoms (12^m8), with the flagstaff in the village bearing 050°, and the northern entrance point of the small bay in which the village stands, 332°. The bottom is very steep-to. The flagstaff is clearly visible, and there is a church in the village, but it is partially obscured by a large tree.
 35 *Chart 3243.*

Nila.—**Anchorage.**—This island, about 23 miles north-eastward of Teoen, is an active volcano, 2,559 feet (780^m0) high, with steep



Nila, bearing 199°, 25 miles.

(Original dated 1933.)

slopes and only covered with vegetation in patches. The coast throughout is high and steep. The northern half of the island is

Charts 2759a, 1263.

Chart 3243.

fringed by a steep-to coastal reef which dries ; a ridge with a depth of 10 feet (3^m0), lies off the north-western edge. This side of the island should not be approached within a depth of about 110 fathoms (201^m2) unless it is intended to anchor westward of Nika (*see below*). There are some coconut plantations on this side of the island.

Chart 2465, plan of Nika anchorage.

A vessel may obtain a sheltered anchorage in an opening between the reefs westward of Nika, an islet, 154 feet (46^m9) high, lying on the reef which extends about 1½ miles northward from Tanjong Keliatotnoe (Lat. 6° 43' S., Long. 129° 32' E.), the north-eastern extremity of Nila. She should approach the opening with the summit of Nila bearing 190°, which leads through the middle, in a least depth of 4½ fathoms (7^m8). The least width in the entrance over the bar is about one cable, between rocks which border the reefs on either side ; those parts of the reefs which dry and the bottom of the channel are marked by discoloration. Allowance must be made for the tidal stream, which sets across the entrance, and it is necessary to keep in mid-channel.

Noesafnoe (Nusafnu), a small islet lying on the shore reef about three-quarters of a mile westward of Tanjong Keliatotnoe, is difficult to identify. The vessel should anchor with Nika bearing between 095° and 090°. This anchorage can also be approached from westward, with the southern extremity of Nika bearing 093° ; this channel, which is only about half a cable wide, can be navigated by eye, passing about 80 yards (73^m2) northward of a small reef, which dries, situated 7 cables westward of Nika.

As upheavals of the bottom around this volcanic island may have taken place, it is advisable to send a boat in to examine the locality before entering.

Chart 3243.

Anchorage may be obtained by vessels, with local knowledge, in depths of from 25 to 33 fathoms (45^m7 to 60^m4) with the village of Wotai, situated on the south coast, bearing 342° ; it is, however, open to the wind and sea during the South-east monsoon. The bay, on the northern shore of which the village stands, is encumbered with reefs, and is too dangerous for a vessel to enter it. There is a flagstaff at the village.

Off-lying dangers.—Doesborgh rif, which dries, lies about 4½ miles north-westward of Nila. The surf and discoloration on this atoll-shaped reef render it visible a considerable distance.

Nil Desperandum or Griffin reef, about 16 miles east-north-eastward of Nila, is a sandy patch which dries about 6 feet (1^m8).

Chart 942a.

Kisar.—**Anchorage.**—This island lies about 18 miles north-north-westward of Tanjong Sewirawa, the eastern extremity of Timor. Tailoetoe, its highest peak, attains an elevation of 787 feet (239^m9). The coast, which consists of coral lime, is high, steep, and rocky, broken only in places where the streams flow out ; the hills in the interior are only sparsely covered with vegetation. *See view facing* page 178.

Indifferent anchorage may be obtained in Reede Pantai Wonréli, off the south-western side of the island, in depths of from 16 to 22 fathoms (29^m3 to 40^m2), coral and stones, about three-quarters of a cable west-north-westward of a conspicuous white pyramid ; if the vessel anchors

Chart 942a.

farther offshore she may drag her anchor owing to the steepness of the bottom ; sudden squalls make the anchorage dangerous. The tidal streams here set north-north-eastward and south-south-westward.

- 5 The best place for landing or loading cargo is near the mouth of the Wonréli rivier, which is exposed west-south-westward, but there is a narrow reef, which dries, with greater depths inside it, lying about half a cable offshore, which acts as a breakwater. A shallow channel, which is available for boats at low water, leads over this reef. There
10 are a few huts at the landing place. Boats can use the landing place between half-tide and high water.

During the West monsoon the roadstead is unsafe, and communication with the shore is interrupted.

- Pantai Wonréli village, situated a short distance inland, is the head-
15 quarters of a Government official ; there is a large church in the village. Goats, sheep and poultry may be obtained, but there are no vegetables. The climate is healthy and there is seldom any malaria. In some years no rain falls, and during these periods the inhabitants migrate to Romang.

- 20 Pantai Poera Poera village (*Lat. 8° 04' S., Long. 127° 10' E.*), situated on the eastern side of the island about 2 miles from the northern end, affords a landing place in the North-west monsoon.

- Lèti eilanden.**—This group consists of three islands, Lèti, Moa and Lakor, the first named lying 23 miles east-south-eastward of Kisar.
25 Lèti and Moa are hilly, but Lakor is low, with trees about 165 feet (50^m3) high.

- Lèti.—Anchorages.**—This island is traversed by a number of ridges of rounded hills, attaining an elevation of 1,332 feet (406^m0), extending in an easterly and westerly direction. The hilly part of the
30 island is surrounded by a belt of flat land, which rises in terraces to heights of from 25 to 65 feet (7^m6 to 19^m8), and on which there are numerous coconut trees. On the southern side of the island there is a separate plain which rises steeply from the sea, where it is undermined by the action of the breakers. *See view facing this page.*

- 35 The best anchorage during the East monsoon is off Serwaroe village, on the northern side of the island, with Woearlawan, the summit of the island, bearing about 180°, and the northern extremity of the island, 101°. The anchorage should be approached on the former bearing. During the North-west monsoon, the anchorage is dangerous,
40 as the holding ground is coral and stones, and is not good. Landing is difficult when there is a rough sea, and loading or unloading of boats can only take place at high water on account of a reef, which dries, fringing the coast.

- There is a small bight, sheltered from westerly winds by a coral reef,
45 situated near Toetoeikai (Tutukai) village, a short distance east-north-eastward of Serwaroe. Boats can approach it through a narrow channel in the reef by keeping two crosses on posts in line, which leads towards two sheds on the shore.

- Off the village of Tombra, about one mile south-westward of
50 Serwaroe, there is an opening in the reef, about three-quarters of a cable wide, inside which small craft with local knowledge may obtain anchorage, in depths of from 6 to 9 fathoms (11^m0 to 16^m5), sand and mud ; the reef on either side dries, and vessels can secure alongside it.

Small vessels with local knowledge may obtain anchorage, in depths

Chart 2759a.

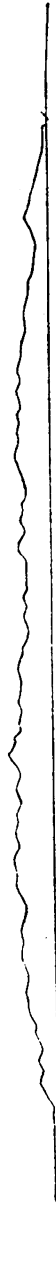
To face page 178.

Tailodoe,
bearing 356°, 15 miles.



Tanjong
Wakodoleron.

Sermata eilanden.—Kisar from southward.
(Original dated 1933.)



↑
Bearing
174°.

Sermata eilanden.—Lèti from northward.
(Original dated 1933.)

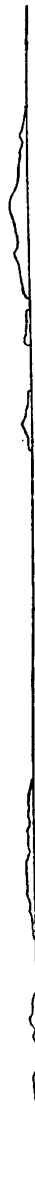
Keljoar Wahan
bearing 284°, 13, miles.



Maroe.

Moloe.

Northern end of Tanimbar eilanden from eastward.
(Original dated 1933.)



Wodiaroe.

Seloe.
bearing 149°, 20 miles.

Tanimbar eilanden from north-westward.
(Original dated 1933.)

Chart 942a.

of from 19 to 38 fathoms (34^m7 to 69^m5), near Loehoelèlè village, situated on the southern side of the island, about 2½ miles westward of Tanjong Soepoermela (*Lat.* 8° 12' S., *Long.* 127° 45' E.), the south-eastern point, between a crescent-shaped reef, which dries, lying off the eastern end of the village, and a sand spit westward of it extending from the sandy beach. These vessels can also obtain anchorage in the basin on the north-eastern side of the crescent-shaped reef, but the swinging room is limited. There is a least depth of 4½ fathoms (7^m8) in the entrance, which is about three-quarters of a cable wide. 5 10

The inhabitants of Lèti dwell on the flat land, principally on the coast; their villages are mostly built on raised coral reefs, which, in places, rise vertically to a height of from 30 to 40 feet (9^m1 to 12^m2). Buffaloes, goats and pigs are plentiful. In times of scarcity the inhabitants migrate temporarily to Moa. 15

Straat Moa.—This strait, between Lèti and Moa, is free from danger. The tidal streams are strong, and when against the wind, raise a rough sea.

Moa.—Anchorages.—This island, about 2½ miles eastward of Lèti, consists of a coral lime plateau, from 30 to 65 feet (9^m1 to 19^m8) high, from which the land rises in the eastern and western parts. In the western part there are two conspicuous peaks, of which, Lkamar, the eastern, is 948 feet (289^m0) high, and covered with vegetation, and Kogotea, the western, is 725 feet (221^m0) high, and bare. The eastern hilly land also has two conspicuous barren peaks, of which, Koeli (Karbau), the western, and higher, has an elevation of 1,230 feet (375^m0). There are several villages on the island, the most important of which is Pati, on the south coast, about 8 miles from the western extremity of the island; in this village there is a church and the remains of a blockhouse. The island is very fertile. 20 25 30

There are no safe anchorages except during the periods of the transition of the monsoons and at the beginning of the East monsoon. Anchorage may, however, be obtained, in a depth of about 19 fathoms (34^m7), off Kaiwatoe village, on the north coast, about 3 miles from the western extremity of the island, with Koeli in line with a small rocky point, bearing 111°, and a flagstaff, 223°. Inland of the village, standing on higher ground and westward of the flagstaff, is a conspicuous white building. The tidal streams at this anchorage frequently change their direction and at times attain a rate of one knot. 35

Anchorage may be obtained in considerable depths off Pati, but the sea is usually too heavy. About 5½ miles eastward of Pati is Klis village, off which a vessel might obtain temporary anchorage with the village flagstaff bearing 047°, and Tanjong Toet Nei, situated about 5 miles westward of Tanjong Soepoer, the south-eastern extremity of the island, 151°. 40 45

During the transition period of the monsoons a vessel can anchor in most places off the southern side of the south-eastern end of Moa, about one cable from the drying coastal reef, in depths of from 19 to 25 fathoms (34^m7 to 45^m7), sand. The tidal streams attain a rate of from 2 to 3 knots along this coast. 50

Straat Lakor.—This strait, between the eastern end of Moa and Lakor, has a least width of about one mile and is clear of dangers. Off Moanga, on the east coast of Moa, about 3 miles north-north-eastward of Tanjong Soepoer (*Lat.* 8° 16' S., *Long.* 128° 03' E.), and off the

Chart 942a.

north-western point of Lakor there are often whirlpools and heavy tide-rips, the streams frequently attaining a rate of 4 knots or even more.

- 5 **Lakor.**—The coast of this island is mostly rocky, interspersed by sandy beaches in some places, such as at the low north-western point. There are several villages on the island. Warwawang, in the middle of the northern coast, stands on a high rock, and is conspicuous.

Charts 942a, b.

- 10 **Babar eilanden.**—The principal islands of this group are Meatij Miarang, Sermata and Babar. All the islands and islets are hilly with the exception of Meatij Miarang, and all can be closely approached. *Chart 942a.*

- Meatij Miarang.**—**Light.**—This island, situated about 16 miles
15 east-south-eastward of Tanjong Njadora, the eastern extremity of Lakor, lies near the south-eastern extremity of an extensive reef which dries, and is densely covered with vegetation. On the north-western end of the reef are Amortaoen and Meaterialam, low islets, thickly covered with vegetation, and on the western extremity of the latter
20 there is a conspicuous tree. The outer edge of the reef is steep-to, and there is no anchorage outside it.

A light (*Lat. 8° 20' S., Long. 128° 30' E.*) is exhibited, at an elevation of 76 feet (23^m2), from a white iron framework structure, 75 feet (22^m9) in height, situated on the western side of Meatij Miarang.

- 25 About half a mile westward of the south-western extremity of Meatij Miarang is Morau, a low islet, and close off the south-eastern end are two rocky islets.

- Within the reef, and extending nearly its entire length, is a lagoon, with two channels, about three-quarters of a cable wide, leading into it
30 on its eastern side; in the northern channel there is a depth of 3½ fathoms (6^m9), and in the fairway of the southern channel, 3 fathoms (5^m5), but there is a 2½-fathom (4^m1) patch on the south-eastern side. This entrance to the channel is marked by a white conical buoy on the north-western side and a black can buoy on the south-eastern side. The
35 tidal streams in the channels may be strong.

Anchorage may be obtained by vessels with local knowledge in the southern part of the lagoon, by entering through the southern channel, steering 222°.

- There is a small village on the island, situated northward of the light-
40 structure, and it can only be reached by boats at high water.

- Loeang and Kalapa.**—These islets, situated about 14 and 18 miles respectively, north-eastward of Meatij Miarang, lie, together with several smaller islets, on an extensive reef, which partly dries. Loeang (Luang) has two peaks, the higher of which has an elevation of 853 feet
45 (260^m0) and is almost barren. Kalapa, the easternmost of the group, is mostly low, but is covered with high vegetation. Lailawan and Metoetoe (Metutun) are low islets situated on the western end of the reef; there are some coconut trees on Metoetoe, but Lailawan is a bare sandy patch.

- 50 There is an anchorage, named Moöra, for small vessels with local knowledge off the western extremity of the reef. Boats can pass over the reef on the northern side of Loeang, where there is a depth of about 3 feet (0^m9) at high water, into a basin with a depth of 5 fathoms (9^m1), sand.

Chart 2759a.

Charts 942a, b.

Sermata.—This island, about $1\frac{1}{2}$ miles eastward of Kalapa (*Lat.* $8^{\circ} 11' S.$, *Long.* $128^{\circ} 47' E.$), is traversed by rounded hills mostly covered with reeds, and on its eastern extremity are four conspicuous limestone terraces, attaining an elevation of about 650 feet (198^m1). 5
About $1\frac{1}{2}$ miles from this end of the island there is a conspicuous wood on a mountain, 1,224 feet (373^m1) high, covered with reeds.

Baai van Lèlang, on the southern side of the island, affords shelter to vessels with local knowledge, during the transition periods of the monsoons and during the West monsoon, but the bottom is steep, 10 and sudden squalls during this monsoon sometimes render the anchorage unsafe.

There are a number of villages on the island surrounded by high stone walls.

Chart 942b.

Babar and Wetan.—Babar, situated 39 miles east-north-eastward of Sermata, is 2,710 feet (826^m0) high near its centre, with a ridge descending steeply to its north-eastern extremity. The water from its rivers often causes discoloration around the island for a considerable distance seaward. 15

Wetan is 1,145 feet (349^m0) high at its southern end, and 449 feet (136^m9) at its northern end, with a coral lime terrace between. 20

Chart 2465, plan of Wetan strait.

Straat Wetan.—**Anchorage.**—**Light.**—Straat Wetan, which separates the western side of Babar from Wetan, is deep in the fairway 25 and has a least width of about one mile. A shoal, with a depth of $3\frac{1}{2}$ fathoms (6^m9), lies about half a mile off the south-eastern side of Wetan, about $2\frac{1}{2}$ miles north-eastward of the southern extremity of the island.

Anchorage may be obtained in Reede Herlei, on the western side of 30 the strait, in a depth of about 27 fathoms (49^m4), off a sandy beach. A vessel may lie here in moderate safety, although the swell at times is troublesome.

Chart 2465, plan of Tèpa road.

Reede Tèpa, on the eastern side of Straat Wetan at its northern end, 35 affords a safe anchorage during the East monsoon. With north-westerly winds there is sometimes a considerable sea and surf on the coast, but there is no danger of drifting unless the wind blows hard. During the West monsoon, however, it is better to anchor in Reede Herlei. 40

A light is exhibited, at an elevation of 16 feet (4^m9), from a wooden mast, 26 feet (7^m9) in height, on the beach at the village of Tèpa.

A reef, with a depth of 6 feet (1^m8), marked on its south-western side by a black can buoy, lies about $2\frac{1}{2}$ cables north-westward of the light- 45 structure.

A vessel should approach the anchorage with the flagstaff, situated close to the light-structure, bearing 090° , and anchor in the required depth. Allowance should be made for the tidal stream, which sets northward and southward. When nearing the roadstead, the depths 50 decrease suddenly. It is recommended to lower the anchor with about 15 fathoms (27^m4) of cable from the bows, and to approach as slowly as possible; during the West monsoon, 25 fathoms (45^m7) of cable should be veered out. If, during this monsoon, it is not possible for

Chart 2465, plan of Tapa road.

the vessel to discharge her cargo in Reede Tapa, a blue flag is displayed, and she should proceed to Herlei.

The best landing place is in a small creek northward of the village, 5 where there is a sandy beach. Tapa (*Lat. 7° 52' S., Long. 129° 36' E.*) is the headquarters of a Government official.

Chart 942b.

Anchorage off Babar.—Shoal.—Anchorage may be obtained anywhere off the south-western side of Babar, taking care to avoid the 10 $2\frac{1}{2}$ -fathom (5^m0) patch situated about $1\frac{1}{2}$ miles offshore, about $5\frac{1}{2}$ miles west-north-westward of the southern extremity of the island; this patch is steep-to and is seldom marked by discoloration. The coastal reef is narrow and steep-to everywhere, and the bottom is rocky. A vessel should approach slowly with the anchor lowered about 38 fathoms 15 (69^m5) from the bow.

Anchorage may also be obtained off the southern and eastern coasts of the island, except in the bay northward of the eastern extremity. The reefs off the east coast, with depths of from $2\frac{3}{4}$ to $4\frac{1}{4}$ fathoms (5^m0 to 7^m8), lying between Wakpapapi and Ahanari villages, situated about 20 3 and 5 miles, respectively, south-south-westward of the eastern extremity of the island, are not marked by discoloration, but the reef, with a least depth of $3\frac{1}{4}$ fathoms (6^m9), lying about $3\frac{1}{2}$ cables off the eastern extremity of the island, is so marked; the passage between this reef and the coast is clear of dangers.

25 With easterly winds a vessel will lie in safety off Jatoke village, situated about 4 miles northward of Letwoeroeng village, which stands on the eastern extremity of the island, in a depth of about 36 fathoms (65^m8), close to the coastal reef. For about $4\frac{1}{2}$ miles westward of this anchorage the depths decrease too steeply as the coast is approached 30 to obtain anchorage; thence to abreast Manoewoei (Manuwui) village, about 7 miles farther westward, anchorage may be obtained anywhere. A vessel should approach with her anchor lowered about 30 fathoms (54^m9) from the bow.

Masela.—This island, about 7 miles south-eastward of Babar, 35 affords anchorage anywhere close offshore, in depths of from 33 to 38 fathoms (60^m4 to 69^m5). The coastal reef is plainly marked by discoloration, as are also the detached patches, with depths of less than 5 fathoms (9^m1), off the western side of the island; those off the east coast are not so marked. When the reef can be plainly seen by 40 discoloration a vessel can obtain anchorage in the bight in the coastal reef off Telalora village, on the south-eastern side of the island about $1\frac{1}{2}$ miles from the southern extremity, but with easterly winds there is too much sea in the entrance.

Charts 2465, plan of Strait between Dawera and Dawelor, 942b.

45 **Dawera and Dawelor.—Anchorages.**—These islands lie about one mile apart, about 11 miles north-eastward of Babar. Dawera, the north-western island, is 1,096 feet (334^m1) high, and Dawelor, 961 feet (292^m9). The passage between them is bordered by reefs on either side, and in the middle there is a reef, with a depth of 10 feet (3^m0), all of 50 which are marked by discoloration. Several patches, with depths of from $2\frac{1}{4}$ to $5\frac{1}{2}$ fathoms (5^m0 to 10^m1), lie about half a mile northward of Dawera.

A well-sheltered anchorage may be obtained by vessels with local knowledge in depths of from 27 to 33 fathoms (49^m4 to 60^m4), during

Chart 2759a.

Charts 2465, plan of Strait between Dawera and Dawelor, 942b.
 the South-east monsoon, westward of Ilmarang village (*Lat. 7° 44' S., Long. 130° 00' E.*), on the south-western side of Dawera. There is no difficulty with good visibility in entering the bight in the reef which is formed by a tongue of reef extending westward from the south-western point of the island, as it is marked by discoloration. Anchorage may also be obtained by vessels with local knowledge off Watoewai village, on the western side of Dawelor, in depths of from 16 to 22 fathoms (29^m3 to 40^m2), sheltered by a tongue of reef extending from the island, which is marked by discoloration. 5 10

Chart 942b.

Dai.—This island, about 13 miles northward of Babar, is 2,136 feet (651^m0) high at its eastern end. The only anchorage is off the village of Léwa, on the northern side of the island, very close to the coastal reef. A vessel approaching this anchorage should lower her anchor with about 15 38 fathoms (69^m5) of cable out. Strong and sudden squalls from various directions render this anchorage unsafe during the South-east monsoon and even during the transition periods.

Chart 3243.

EILAND SEROE.—**Anchorage.**—This island, about 38 miles 20 north-eastward of Nila, is an active volcano, 2,100 feet (640^m1) high; near the north-western extremity of the island there is a conspicuous knob, 798 feet (243^m2) high. The coast is fringed by a narrow reef in places, but it nowhere extends more than one cable offshore.



Seroea, bearing 084°, 20 miles.

(Original dated 1933.)

Kekeh Besar and Kekeh Keehil lie on the same reef about 4 cables 25 westward of Tanjong Atoerin, the western extremity of Eiland Seroea, with a clear and deep passage between.

Anchorage may be obtained by vessels with local knowledge in this passage, in depths of from 33 to 38 fathoms (60^m4 to 69^m5), also in depths of from 38 to 44 fathoms (69^m5 to 80^m5), northward of a small 30 sandy beach, situated on the north coast about 2 cables north-westward of the conspicuous knob; it can be identified by some sheds. This anchorage should be approached with Lesloeroe village (*Lat. 6° 18' S., Long. 130° 00' E.*), situated high up on the saddle between the sheds and the summit of the island, in line with the sheds, bearing 186°, 35 anchoring about 1½ cables northward of the drying reef.

Chart 942b.

TANIMBAR EILANDEN.—These islands lie at the eastern end of the chain of islands extending from Timor towards the Aroe eilanden. Jamdena (Yamdena) is the principal island, and except on Moloe and 40 Karata, all the inhabitants are Christians. Except for Moloe, Maroe, Fordate, and Laibobar and the larger islands off the west coast of Jamdena, the Tanimbar eilanden are low and flat.

Chart 2759a.

Chart 942b.

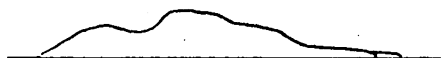
Jamdena is hilly in the southern part, northward and westward of Baai van Saumlaki, but there are no conspicuous peaks; there are also a few hills near the east coast. There are numerous coconut plantations.

The coastal reefs provide large quantities of trepang and mother-of-pearl shell; timber is abundant in the forests, and in the interior of Jamdena are some untouched oil-fields. Outside the inhabited parts of Jamdena wild buffaloes are plentiful. Pigs and cattle can be obtained in the villages, and in the surrounding sea fish and turtle abound.

Off the west coasts of Jamdena and Selaroe, and in Straat Egeron the reefs show very slight discoloration, in consequence of which a vessel should be accurately fixed by the land, and not navigated by eye.

Charts 3243, 942b.

15 Islands northward of Jamdena.—Anchorages.—Moloe and Maroe lie at the northern end of the group, Melwoear Niwejar, 896 feet (273^m1) high, situated at the northern end of Moloe, is the highest peak (*see* view facing page 178), and Keljobar Wahan, 643 feet (196^m0) high, lies near the southern end of the same island. Loebwaän, 876 feet (267^m0) high, is the summit of Maroe, and is very conspicuous.



Moloe, bearing 328°, 15 miles.
(Original dated 1933.)



Maroe, bearing 300°, 10 miles.
(Original dated 1933.)

The channel between Moloe and Kalboer, an uninhabited islet lying northward of it, is clear of dangers. There is sometimes a heavy sea in this passage.

The country round Telok Loka and the west coast of Maroe alone are inhabited; the scattered villages are connected by paths. In parts of Moloe, and on the uninhabited parts of Maroe, are coconut plantations. The coastal reef, stretching far out from the south-western point of Maroe, is thronged in fine weather by trepang fishers from Moloe.

There is good anchorage for vessels with local knowledge off Adodo village, on the north-west coast of Moloe, in a depth of 22 fathoms (40^m2), about 5½ cables north-westward of the village.

Anchorage may be obtained by vessels with local knowledge in Telok Loka, on the eastern side of Moloe, in the West monsoon. The reef extending from Kiloen village (*Lat.* 6° 43' S., *Long.* 131° 36' E.) is marked by discoloration and shows up well.

There is good anchorage everywhere off the east coast of Maroe, in depths of from 22 to 27 fathoms (40^m2 to 49^m4), except off the coconut plantation on the south-eastern point.

Chart 942b.

The channel between Maroe and Wajangan (Wayangan) is clear and

Chart 2759a.

Chart 942b.

deep, and is the most convenient route for vessels bound for Ritabel (page 189) from north-westward, especially when the South-east monsoon is well set in, as it sometimes blows very hard in these parts. After passing through this passage, shelter is also afforded by Fordate and Larat; there are strong tide-rips in this vicinity when the wind is against the tidal stream.

Noes (Nus) Lima (*Lat. 6° 59' S., Long. 131° 35' E.*) is a group of islets and reefs, lying about 5 miles south-eastward of Maroe. The reef which surrounds these islets is well marked by discoloration, but the shoals are not. The group is uninhabited, except Wermatan, the westernmost islet, on which there are a few temporary huts near the coconut groves.

The passage between Wermatan and Kjabrengan, about $1\frac{1}{2}$ miles north-westward, should be avoided.

Frinoen, about $3\frac{1}{2}$ miles southward of Wermatan, is a low and thinly wooded islet surrounded by a reef, on the northern end of which there is a conspicuous rock. Farnoesan is an islet lying on a reef about $5\frac{1}{2}$ miles east-south-eastward of Frinoen; this reef and also the reef extending from the northern extremity of Jamdena, about $1\frac{1}{2}$ miles southward, are well marked by discoloration.

WESTERN SIDE OF JAMDENA.—Off-lying islands.—Namwaän and Itain, 495 and 420 feet (151^m0 and 128^m0) high, respectively, lie about $4\frac{1}{2}$ miles north-westward of the northern end of Jamdena. They are being gradually cleared for coconut plantations, and, in consequence, their appearance is continually changing. The channel between the two islands is clear of dangers in the fairway, but it should only be used when the reefs on either side are visible.

Vatvoerat eilandje lies eastward of the channel just referred to, with a clear passage between. There are two small rocks above water, lying off the southern end of the islet, the northern of which bears a striking resemblance to the Madonna and Infant.

Two reefs, over which there is a depth of 3 feet (0^m9), lie $1\frac{1}{2}$ and 2 miles, respectively, north-eastward of Vatvoerat, and are well marked by discoloration.

Temar, situated $1\frac{1}{2}$ miles southward of Namwaän, is a low, wooded coral islet covered with vegetation; the reef fringing it does not show well.

Kabawa and Karata are high, conspicuous islets lying between the eastern side of Namwaän and the coast of Jamdena. Mitak, an island on which there is a coconut plantation, lies about $1\frac{1}{2}$ miles off the north-western coast of Jamdena; the passage between is encumbered with rocks. There is a landing stage for small craft on the southern side of the island.

Laibobar, 1,283 feet (391^m1) high, and densely covered with vegetation, is the highest peak in the Tanimbar group; it lies about $4\frac{1}{2}$ miles south-south-westward of Namwaän.

Good anchorage may be obtained by vessels with local knowledge on the southern side of the island, in a bay in which the coastal reef is marked by discoloration. There is no difficulty in entering this bay, or in passing through the channel between Oengar (Ungar) and Laibobar.

A reef, with a depth of $2\frac{1}{2}$ fathoms (4^m6), lies about $1\frac{1}{2}$ miles eastward

Chart 2759a.

Chart 942b.

of Tanjong Somorwahan (*Lat. 7° 12' S., Long. 131° 24' E.*), the northern extremity of Laibobar; it is not marked by discoloration.

- Boloe, an islet lying close off the coast of Jamdena, about $1\frac{1}{2}$ miles southward of Mitak, is low and covered with vegetation. Oengar and Voelmali, lying within 3 miles southward of Laibobar, are also densely covered with vegetation. A reef, with rocks above water on it, lies about half a mile east-north-eastward of Voelmali; it is not well marked by discoloration, but it can be avoided by keeping close to the reef extending from the southern side of Oengar.

- Straat Jamdena.—Caution.—Dangers.**—Straat Jamdena (Yamdena) lies between the western side of Jamdena and the islands westward of it. It is easy to navigate. Discoloured water, which does not always indicate the presence of reefs or shoal water, is frequently seen in this and the adjacent channels; it is more noticeable during bright, but cloudy weather, being caused by the shadows of the clouds, and by mud stirred up by the current.

- Wotap, lying at the northern entrance of the channel, is 620 feet (189^m0) high; there are two small bays on its western side, which afford good anchorage to vessels with local knowledge. See view facing this page.

For Straat Wotap, see page 187.

- Woeliaroe (Wuliaru), about 4 miles south-westward of Wotap, is 617 feet (188^m0) high near the middle. (See view facing page 178.) There are many off-lying dangers, but they are mostly marked by discoloration.

- Seloe, separated from Woeliaroe by Straat Noelen, has two conspicuous peaks at its western end, Amat Dawah, 692 feet (210^m9), and Woeroe Woeroe, 679 feet (207^m0) high. Off the north-western point of the island is Nitoe eilandje, 249 feet (75^m9) high, which is a good mark. Off this islet and also off Tanjong Metanoean, the south-western point of the island, there are, at times, strong tide-rips, which raise a heavy sea. See views facing this page.

- Keswoe, 341 feet (103^m9) high, lies about midway between Woeliaroe and Jamdena; it is separated from Wolas, an islet eastward of it, by a narrow, deep channel, clear of dangers. Close eastward of Wolas there are a number of reefs, some of which dry and form sandbanks. The passage between these reefs and the coast of Jamdena, and that between Keswoe and a reef about $1\frac{1}{2}$ miles west-north-westward of its north-western extremity, are clear of dangers. A $2\frac{1}{2}$ -fathom (5^m0) patch lies about $1\frac{1}{2}$ miles westward of Keswoe.

- A reef, which dries, situated about $1\frac{1}{2}$ miles from the eastern side of Woeliaroe, about $3\frac{1}{2}$ miles northward of Wolas, is almost always marked by discoloration. Noes Taram are three conspicuous islets lying on the mudbank extending from the western side of Jamdena, about $4\frac{1}{2}$ miles north-eastward of Wolas. Two detached reefs, which dry, lie from $4\frac{1}{2}$ to $4\frac{3}{4}$ miles south-westward of Keswoe.

Chart 2465, plan of Wailutu road.

- Soekeler (Sukeler), an island in the southern entrance of Straat Jamdena, about $12\frac{1}{2}$ miles south-westward of Keswoe, is an excellent mark. (See view facing this page.) Lengwati, an islet, lies on the edge of the reef which extends about three-quarters of a mile from the south-western side of Soekeler. A $4\frac{1}{2}$ -fathom (7^m8) patch lies about $3\frac{1}{2}$ miles west-south-westward of Soekeler.

Chart 2759a.

To face page 186.

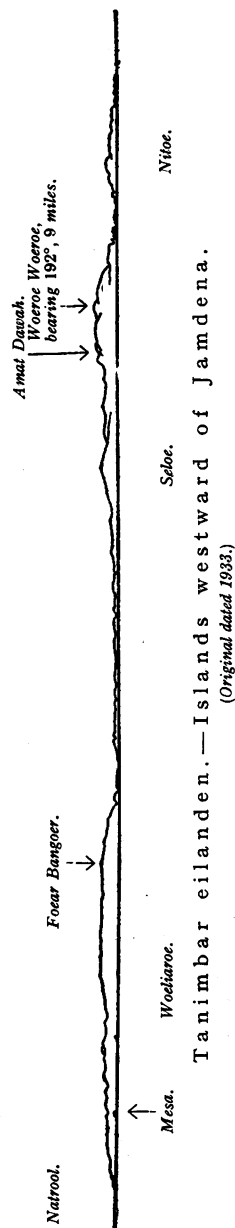
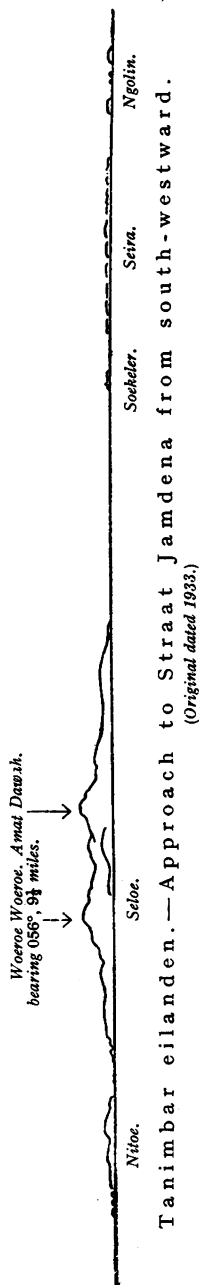
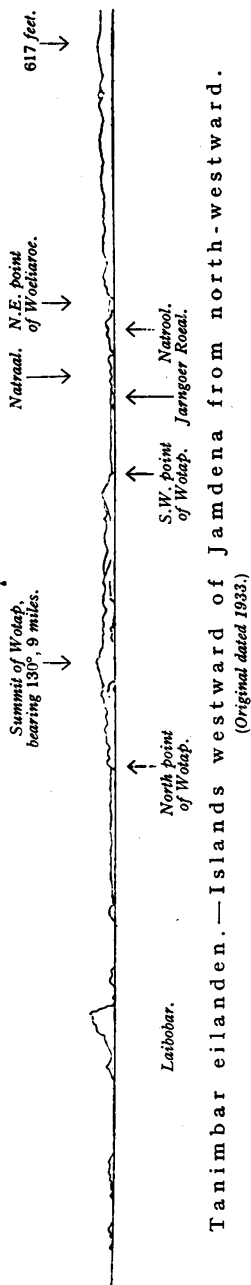


Chart 942b.

Seira is separated from the western side of Jamdena by the narrow shallow channel, Pintoe Tandoela, which is frequently used by praus. The reefs and shoals southward of Seira are only slightly marked by discoloration. Baai van Salwassa is a muddy inlet extending into the western side of Jamdena eastward of Seira; it has not been closely examined and its depths are liable to change. Salwassa village stands on the southern side of the inlet, and Salwassa rivier flows into the head. Ngolin, an islet lying on the reef which extends about $4\frac{1}{2}$ miles south-south-westward from the south-western end of Seira, is conspicuous, its northern half being thickly, and its southern half very sparsely, covered with vegetation.

Bara Sadi (*Lat. $7^{\circ} 48' S.$, Long. $130^{\circ} 48' E.$*), a reef which dries, situated about 10 miles south-westward of the south-western extremity of Seira, is generally visible from a considerable distance on account of the sea breaking over it.

Tidal streams.—Along the southern side of Seloe, the tidal stream sets generally southward with the rising tide and northward during the falling tide, at a maximum rate of 2 knots, but a definite time when the streams turn is not known. In Straat Jamdena, during July, August, and the beginning of September, the maximum rate does not exceed one knot. As the stream slackens, the discoloration of the water increases.

Straat Wotap.—This strait, which separates Wotap from Woeliaroe, is a convenient passage for entering Straat Jamdena from westward. Jarngoer Roel and Jarngoer Raa are two sandbanks, covered with vegetation, lying on separate drying reefs, situated near the middle of the strait, with a passage on either side.

Natroot eilandje, 236 feet (71^m9) high, and Natraal eilandje, 171 feet (52^m1) high, about $1\frac{1}{2}$ miles south-eastward of it, lie on the southern side of the strait.

Directions.—The channel, northward of the reefs just referred to, is recommended, but that southward of them may also be used. Approaching from westward, after sighting the south-western point of Wotap, a vessel should keep Jarngoer Raa, bearing 132° , until the conspicuous rocky point with a rock lying off it, about one mile south-eastward of the 305-foot (93^m0) hill on the south-western point of Wotap, bears 013° ; she should then steer 102° (Jarngoer Roel will then be well open westward of Natroot), until the eastern edge of Jarngoer Raa is in line with the summit of Natraal, bearing 218° , when she should steer 131° , bringing the rocky point, referred to above, almost right astern, which will lead clear into Straat Jamdena.

If proceeding through the southern channel, she should keep the southern extremities of Jarngoer Raa and Jarngoer Roel in line, bearing 097° , until the western extremity of Natroot is in line with the eastern extremity of Woeliaroe, bearing 194° , when she should steer 127° , until the western extremity of Natraal is in line with the eastern extremity of Wolas, bearing 196° , and then steer an easterly course into Straat Jamdena.

When the reefs can be distinguished, both of these passages may easily be navigated by eye. The relatively large reef lying about 3 cables south-eastward of the conspicuous rocky point with the off-lying rock in the northern channel referred to above, can almost always be distinguished on account of its discoloration, and besides, it partly dries.

Chart 942b.

Tidal streams.—The tidal streams in Straat Wotap set in the direction of the channel at a maximum rate of about one knot.

Chart 2465, plan of Egeron strait.

- 5 **STRAAT EGERON.**—This strait, separating Selaroe from the southern end of Jamdena, presents no difficulties. Anggarmasa (Anger Masa) and Matkoes (Matkusa) are two islands lying near the middle. (See views facing this page and page 189.) On the latter there is a coconut plantation, and owing to the felling of the trees, the
10 aspect of the island is continually changing; in 1925, it appeared as two hills with low lying ground between. Vessels proceeding from Saumlaki to Adaoet should pass between Matkoes (*Lat.* 8° 04' S., *Long.* 131° 13' E.) and Battjawat (Tikus), about 1½ miles west-north-westward. Noestaboen (Nusa Tabor), an islet, lies about 1½ miles
15 north-westward of the northern extremity of Matkoes; a ridge, with a depth of 3½ fathoms (5^m9), which is seldom marked by discoloration, extends about half a mile northward from the islet.

- Reede Saumlaki.**—**Light.**—This roadstead lies on the eastern side of Baai van Saumlaki, between the parallels of 7° 58' S. and
20 8° 00' S., and is entered from the northern side of Straat Egeron at its eastern end. It affords a secure anchorage at all times. The zinc roof of the Roman Catholic mission house is a good mark on which to approach.

- Saumlaki is the headquarters of a Government official. Fresh water
25 can be obtained from a pipe laid on to the head of the stone pier, on the eastern side of the bay. Saumlaki is connected to the general telegraph system.

A light is occasionally exhibited, at an elevation of 13 feet (4^m0), from a post on the head of the pier.

- 30 **Rainfall.**—See page 25.

Chart 942b.

- Selaroe.**—This island, the northern coast of which forms the southern side of Straat Egeron, is low; only at its south-western end is there a range of hills attaining an elevation of 236 feet (71^m9); there
35 are, however, some lower hills close within Tanjong Wadatoetoe, the north-western point of the island.

Chart 2465, plan of Egeron strait.

- Reede Adaoet, on the northern side of Selaroe, affords a safe anchorage close off the pier, situated on the eastern side of the inlet near the
40 entrance, at all times. A shed with a zinc roof on the head of the pier is a good mark to use when anchoring. The channel southward of Noejanat (Nojanak), in the north-western approach to the roadstead, is clear of dangers.

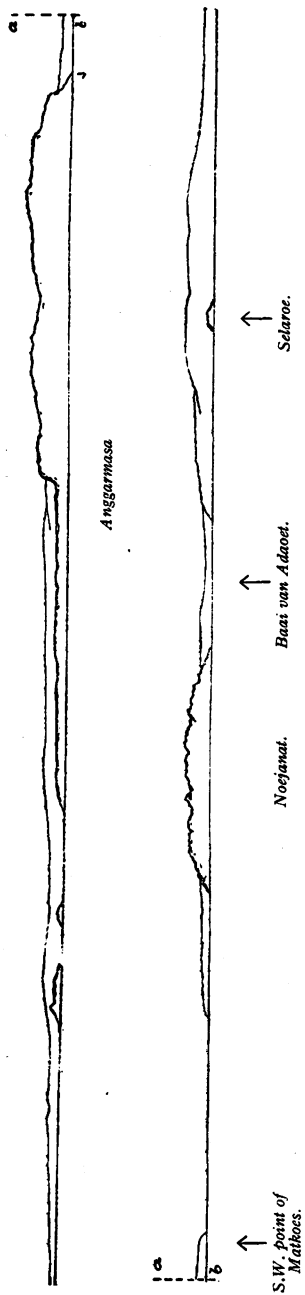
Chart 942b.

- 45 Labuan Olendir and Labuan Lemian, on the north-western and western sides, respectively, of Selaroe, afford convenient anchorages to vessels with local knowledge. With south-westerly and westerly winds, good shelter may be obtained off Namtaboeng village, on the southern side of Labuan Olendir, eastward of the reef extending from
50 Tanjong Wadatoetoe; the coastal reef here is well marked by discoloration.

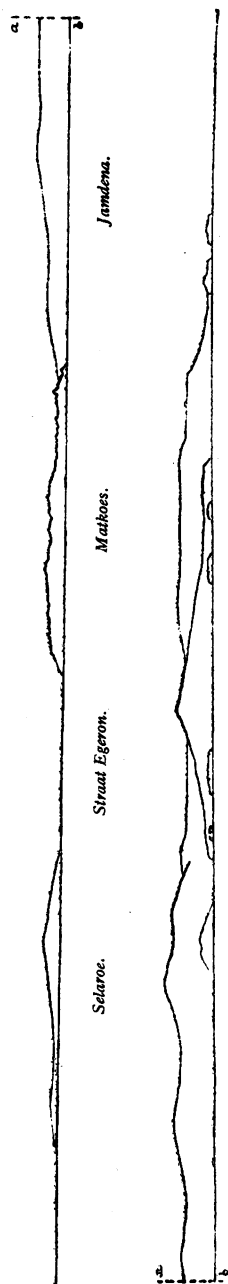
Directions.—A vessel approaching from eastward, after passing the southern end of Selaroe, should round the south-western point of that

Chart 2759a.

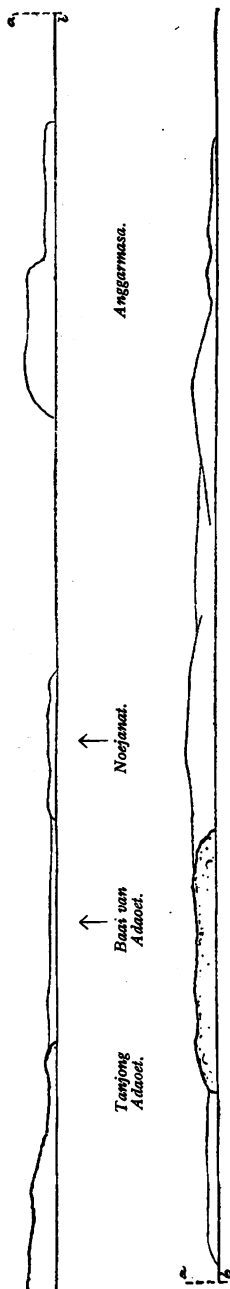
To face page 188.



Tanimbar eilanden.—View, in two parts, of Straat Egeron from westward.
(Original dated 1933.)



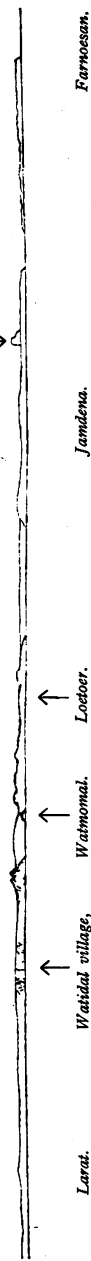
Tanimbar eilanden.—View, in two parts, of Straat Egeron from north-eastward.
(Original dated 1933.)



Mathoos.

Tanimbar eilanden.—View, in two parts, of Straat Egeron from south-eastward.
(Original dated 1933.)

Laibobar peak,
bearing 246°.



Tanimbar eilanden.—Approach to Reede Ritabel from northward.
(Original dated 1933.)

Bearing
156°.



Tanimbar eilanden.—Fordate summit, bearing 156°.
(Original dated 1933.)

Chart 942b.

island at a distance of one mile, and then, if proceeding north-westward, steer to pass close southward of Riama, a low islet thickly covered with vegetation, situated about $5\frac{1}{2}$ miles north-westward of Tanjong Aro Oesoe (Aro Usu), the south-western point of Selaroe; this will avoid the $5\frac{1}{2}$ -fathom (10^m1) patch which lies about 3 miles south-westward of Riama. The passage between Riama and the south-western coast of Selaroe is clear of dangers. 5

EASTERN SIDE OF JAMDENA.—Off-lying islands.—Larat, an island separated from the north-eastern side of Jamdena by a narrow channel, is low and covered with vegetation. Vatsori (*Lat. $7^{\circ} 07' S.$, Long. $131^{\circ} 47' E.$*), a rock lying on the coastal reef on the northern side of Larat near its western end, resembles a large prau without any masts from a distance westward. A wreck, lying on the edge of the coastal reef off the southern extremity of the island, is plainly visible. See view 15 facing this page.

The passage between the conspicuous rock Vatoelmaa, on the edge of the coastal reef on the southern side of Larat, about 3 miles north-westward of its southern extremity, and Sari Karmoet, a reef lying about $1\frac{1}{2}$ miles south-westward of the rock, is clear of 20 dangers.

Chart 2465, plan of Ritabel bay.

Reede Ritabel and approaches.—Light.—Beacons.—Reede Ritabel is situated between the western side of Larat and Loetoer (Lutur), a flat island about $3\frac{1}{2}$ cables westward. The limits of the 25 roadstead are an imaginary line drawn from Watmomal, a conspicuous rocky islet lying close off the northern extremity of Loetoer, to a point on the north-western side of Larat about three-quarters of a mile north-north-eastward, and the parallel of $7^{\circ} 09' 23'' S.$ See view facing 30 this page.

On Farnoesan, an islet lying about 4 miles north-westward of Loetoer, there are some temporary dwellings and a coconut plantation. Meti Rottan rif, which is well marked by discoloration, lies about midway between Farnoesan and Loetoer.

A light is occasionally exhibited, at an elevation of 13 feet (4^m0), from 35 a post on the pier-head at Ritabel.

A white beacon, surmounted by a ball, stands on the edge of the reef extending northward from the north-eastern end of Loetoer, and marks the western side of the channel leading to Ritabel.

A black beacon, surmounted by a truncated cone, stands on the edge 40 of the reef extending north-westward from Watidal village, situated on a hill on the north-western side of Larat, about $1\frac{1}{2}$ miles north-north-eastward of the light-structure, and marks the eastern side of the same channel.

Ritabel village stands on the western extremity of Larat, and 45 Lelingloeian village on the eastern side of Loetoer. Good anchorage may be obtained, in depths of from $6\frac{1}{2}$ to 11 fathoms (11^m9 to 20^m1), mud, about midway between these villages. There is no swell at the anchorage except with strong northerly winds.

Ritabel is the headquarters of a Government official. 50

The southern approach to Ritabel, between Larat and Jamdena, is only navigable by small craft with local knowledge. There is a least depth of about 2 feet (0^m6) in the fairway.

Chart 2759a.

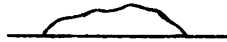
Chart 942b.

Fordate.—This island, separated from the north-eastern side of Larat, by Straat Orafroen, is hilly and has several conspicuous peaks (see view facing page 189). Only on the west and south coasts are there any villages. At Aweër, on the north-western side of the island, there is a conspicuous church.

Straat Orafroen is clear of dangers in the fairway, and the shore reefs on either side are well marked by discoloration.

Anchorage may be obtained by vessels with local knowledge, in a depth of about 27 fathoms (49^m4), except off the rocky parts southward of Adodoe and Sofianin villages, situated in the middle of the west coast.

Schildpad eiland or Noe ka ha (Nu ka ha) (*Lat.* 7° 04' S., *Long.* 132° 00' E.), 128 feet (39^m0) high, and thickly covered with vegetation,



Schildpad eiland, bearing 080°, 7 miles.

(Original dated 1933.)

lies on the western extremity of an extensive reef, well marked by discoloration, situated about 4½ miles eastward of the southern extremity of Fordate.

Dangers off the eastern side of Jamdena.—Sari Karmoet has been described on page 189. Sari Karmoeta, a reef which dries, lies about 7 miles offshore, 10½ miles south-westward of the southern extremity of Larat. Sari Batsir and Sari Watoeroe, both of which dry, lie about 7 miles offshore, about 8½ and 10½ miles, respectively, southward of Sari Karmoeta. A 4½-fathom (7^m8) patch lies about 2½ miles north-north-westward of Sari Batsir. Sari Kilmasa, which dries, lies about 5 miles offshore, about 7 miles south-south-westward of Sari Watoeroe, and about midway between these two reefs there is another reef which dries. Between these reefs and the coast of Jamdena there are several shoal patches, with depths of from 2½ to 5½ fathoms (4^m1 to 10^m1), which are seldom marked by discoloration, but none of these lie less than 2½ miles from the coast.

Directions.—A vessel from northward proceeding down the east coast of Jamdena, from December to March, when the North-west monsoon is often very strong, is recommended to pass through Straat Orafroen; after rounding the south-eastern extremity of Larat, a good view may be obtained of the peak on Laibobar (page 185), off the north-western coast of Jamdena. She should pass south-eastward of Sari Karmoet and Sari Karmoeta and then steer for the conspicuous point on which stands the village of Watmoeri, situated about 17½ miles south-westward of the southern extremity of Larat; she should give this point a berth of at least one mile, and thence keep close offshore to Straat Egeron. Care must be taken when passing the village of Aloesi (Alusi), 16½ miles south-south-westward of Watmoeri, as the presence of iron ore in that vicinity may cause a magnetic disturbance of the compass.

A strong stream, of discoloured water often flows from the Rivier Weri Tambrian, lying northward of the islet Mes, situated about 14 miles south-westward of Aloesi; a great part of it runs through the

Chart 2759a.

Chart 942b,

passage between Mes and Jamdena. This passage, therefore, should not be used, except when the water is clear and reefs clearly visible. Care must be taken when approaching Straat Egeron to avoid the drying reef, which extends about one mile eastward from Asoetoeboen (Asutubun) (*Lat.* $8^{\circ} 03' S.$, *Long.* $131^{\circ} 17' E.$), an island lying close southward of the southern extremity of Jamdena. 5

Charts 942a, b.

ARAFURA SEA.—The Arafura or Timor sea, that part of the Indian ocean extending from the island of Timor to the Torres strait, is bounded on the south by the northern coast of Australia, and on the north by part of the south-west coast of New Guinea and the chain of islands lying between it and Timor. 10

This sea being little known beyond the routes generally taken by vessels from Timor towards Torres strait, and between Port Darwin and Torres strait, it is probable that shoals exist in addition to those marked on the Admiralty charts. As the positions and even the existence of some of these are doubtful, a vigilant lookout should be kept, with the view to removing these doubts, as well as for the safety of the vessel. 15

Chart 2759a.

Depths.—The depths in the greater part of the Arafura sea are less than 100 fathoms (182^m9). They increase from 6 fathoms (11^m0) at the eastern end to about 30 fathoms (54^m9) between Kaap Valsch (page 244), in New Guinea, and Cape Wessel in Australia, whence they increase more rapidly to about 100 fathoms (182^m9), attaining a depth of over 750 fathoms (1371^m6) southward of the Tanimbar eilanden. A less depth, however, continues westward along the northern and north-western coasts of Australia. 20

The depths over the northern part of this bank, eastward of the meridian of Dundas strait, are fairly regular, but westward of that line, especially near depths of 100 fathoms (182^m9), they are very irregular, and various shoals have been found (*see* below). Other dangers probably exist, and a good look-out should be kept when navigating in these waters. 30

Isolated dangers in Arafura sea.—The following dangers lie in the Arafura sea between long. $128^{\circ} E.$ and long $133^{\circ} E.$ and are in the track of vessels making for the northern coast of Australia between those meridians. 35

Chart 942a.

Troubadour, a bank, in lat. $9^{\circ} 44' S.$, long. $128^{\circ} 28' E.$, has a depth of 9 fathoms (16^m5), and is steep-to. 40

Chart 1044.

Flinders shoal, about 50 miles east-south-eastward of Troubadour, has a depth of 5 fathoms (9^m1), and is $1\frac{1}{2}$ miles in diameter. Franklin shoal, about 2 miles eastward of Flinders shoal, has a depth of 5 fathoms (9^m1), and is one mile in diameter. Blackwood shoal, about 6 miles eastward of Franklin shoal, has a least depth of 7 fathoms (12^m8), coral. Evans shoal, about 8 miles eastward of Blackwood shoal, has a depth of 5 fathoms (9^m1), coral, and lies on the northern end of a bank, with depths of from 7 to 10 fathoms (12^m8 to 18^m3). 45

It is probable that many other shoals exist on or near the same parallel of latitude, both eastward of Evans shoal and westward of Flinders shoal. The four shoals referred to above are probably part of 50

Chart 2759a.

Chart 1044.

a submerged barrier, lying along the edge of the bank. Northward of them the bottom is globigerina ooze.

Lynedoch bank, in lat. $10^{\circ} 02' S.$, long. $130^{\circ} 49' E.$, has a least depth of 7 fathoms (12^m8), and is about three-quarters of a mile in extent.

Chart 1042.

Money shoal, in lat. $10^{\circ} 21' S.$, long. $132^{\circ} 45' E.$, has a least depth of 3 fathoms (5^m5), coral, on its eastern edge, and has been observed to break during fresh easterly winds.

- 10 For further details of these and other dangers near the northern coast of Australia, see Australia Pilot, Vol. V.

Chart 942b.

- 15 Le Cher bank (*Lat. $8^{\circ} 27' S.$, Long. $136^{\circ} 16' E.$*), with a least depth of 13 fathoms (23^m8), and steep-to, lies in the northern part of the Arafura sea, about 80 miles westward of Kaap Valsch.

A shoal area, which up to 1938 had not been examined, lies westward and north-westward of Le Cher bank; a depth of 5 fathoms (9^m1), rock, lies in the south-western part of the area, about 27 miles westward of the western end of Le Cher bank.

Chart 2759a.

CHAPTER V

COAST OF NEW GUINEA.—TANJONG SÉLÉ TO KAAP DE GOEDE HOOP,
AND TANJONG SÉLÉ TO BENSBAACH RIVER.—OFF-LYING ISLANDS.

Chart 2759a.

NEW GUINEA.—The western portion, only, of New Guinea, which forms part of the Netherlands possessions, is described in this chapter. The boundary is approximately the meridian of 141° East longitude.

5

For general remarks on New Guinea, *see* page 3.

Chart 942b.

ISLANDS AND OUTLYING BANKS.—Waigeo, which is described on pages 195-202, and numerous islands and banks lie north-westward and northward of the western end of New Guinea.

10

Sajang (Sayang), a low and flat island with high trees, lies about 120 miles north-north-westward of Tanjong Sélé, the western extremity of New Guinea. A shoal, with a charted depth of $3\frac{1}{4}$ fathoms (5^m9), lies about 2 miles off the south-western side of the island; there are a number of other shoals lying within one mile of the southern and south-western sides of the island, which are discoloured by the white sandy bottom, which can be seen at depths up to 10 fathoms (18^m3). Ai (*Lat. $0^{\circ} 20' N.$, Long. $129^{\circ} 52' E.$*), an islet about one mile northward of the north-western end of Sajang, is low and flat, with high trees. Hunter bank, with a depth of 8 fathoms (14^m6), not marked by discoloration, lies about 5 miles eastward of Sajang.

15

Ormsbee bank, with a least charted depth of 9 fathoms (16^m5), Winchester bank, with 13 fathoms (23^m8), and Aurora bank, with 7 fathoms (12^m8), lie about 18 miles, north-north-eastward, 19 miles north-north-westward, and 30 miles north-westward, respectively, of the north-western extremity of Sajang. Breakers are sometimes seen over these banks, but they are not marked by discoloration.

25

Wajag (Wayag), an island, 667 feet (203^m3) high, lies about $7\frac{1}{2}$ miles south-eastward of Sajang. A $2\frac{1}{2}$ -fathom (5^m0) patch, marked by discoloration, and a $4\frac{1}{2}$ -fathom (7^m8) patch, not so marked, lie about $2\frac{1}{2}$ and $3\frac{1}{2}$ miles, respectively, south-south-eastward of the western extremity of Wajag. Stephanie, Quoy (Kwoi), Coquille and Uranie are high, serrated rocky islets, with a number of isolated rocks in their vicinity, lying in that order east-south-eastward of Wajag. *See* view facing page 195.

35

Chart 1263.

Chart 942b.

A $4\frac{1}{2}$ -fathom (8^m7) patch, marked by discoloration, lies about $1\frac{1}{2}$ miles southward of Stephanie.

Strong tidal streams set round and between these islands. They are uninhabited. The forests on the islands are practically inaccessible owing to the agas (small stinging gnats).

Chart 3745.

Kawé, 2,350 feet (716^m2) high in the southern part, lies about 8 miles north-north-westward of Tanjong Sel Pele, the western extremity of Waigeo. The northern part of the island is densely wooded, the southern part is of a reddish colour, sparsely covered with vegetation.

Deem (Dem), a rock, 169 feet (51^m5) high, and wooded, lies about $1\frac{1}{2}$ miles north-westward of the north-western extremity of Kawé, and is very conspicuous. Two rocks, above water, on which the sea usually breaks, lie about three-quarters of a mile off the northern end of Kawé. The tidal streams here are strong, and westward of Deem there are sometimes heavy tide-rips.

Balabalak, an island 582 feet (177^m4) high, and covered with grass, lies nearly 2 miles westward of the southern part of Kawé, with Black rocks, 14 feet (4^m3) high, between them. Several shoals, with depths of from $3\frac{1}{2}$ to 7 fathoms (6^m9 to 12^m8), lie about 7 miles south-south-westward of the southern extremity of Kawé. Some rocks above water lie in Straat Bougainville, about $2\frac{1}{2}$ and 3 miles southward of the same point.

25 *Chart 942b.*

Asia eilanden and Ajoe eilanden.—Asia eilanden, consisting of Fani, Igi and Miarin (*Lat. $1^{\circ} 00' N.$, Long. $131^{\circ} 13' E.$*), lie on a drying reef, about 65 miles north-north-eastward of the northern extremity of Waigeo; they are low, but covered with high trees. There are no permanent inhabitants, but the natives from the Ajoe eilanden visit the islands occasionally.

The reef on which these islands lie is steep-to, and the edges of the reef are never visible except at low water springs, and consequently must be approached with caution.

35 The current during the survey, in June, 1928, set strongly westward along the reefs, especially through the passage which lies between the two groups of the Ajoe eilanden. The natives state that during the northerly monsoon there is an easterly current, when the swell causes heavy breakers.

40 Ajoe (Ayu) eilanden, situated about 26 miles north-north-eastward of the northern extremity of Waigeo, lie on two extensive reefs which



Ajoe, bearing 045° , about 15 miles.

(Original dated 1933.)

dry. Ajoe, 346 feet (105^m5) high, the largest island of the group, lies on the southern reef, and is inhabited. Oer (Ur) Babo are two wooded islets lying on the southern reef about $4\frac{1}{2}$ miles west-north-westward of Ajoe.

45 Mios Koean (Mios Kuan), the southernmost island on the northern reef, is a sand cay covered with coconut trees, on which there is a village. On the southern end there is a conspicuous plume-shaped

Chart 1263.

Coquille.

Uranie,
bearing 292°, 7 miles.

Islands north-westward of Waigeo.

(Original dated 1933.)



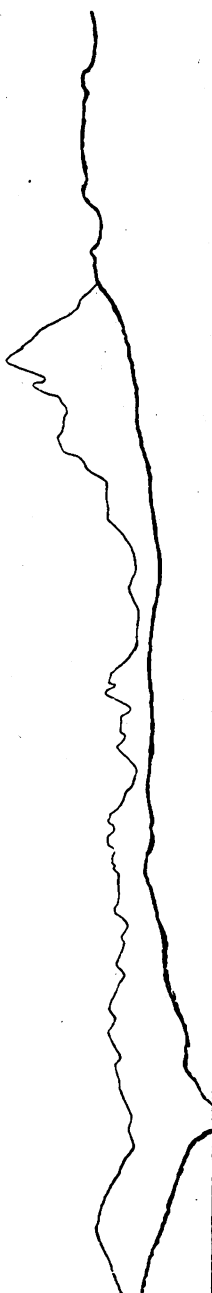
Schoon
bearing 079°, 15 miles.

Buffelhoorn.

Sipstipa.

Saripa baai.

Buffelhoorn,
bearing 112°, 26 miles.



Buffelhoorn.



Manorran
bearing 080°, 16 miles.

Fofak baai.

Three views of the north coast of Waigeo.

(Original dated 1933.)

Chart 942b.

casuarina tree, and close off its northern end there is a rock covered with shrubs. Mios Ros, a wooded rock, lies on the eastern edge of the reef, about one mile eastward of the northern extremity of Mios Koean. Abdon, 292 feet (89^m0) high, lies on the western side of the large lagoon, 5 in the middle of this reef; on its southern side are some houses and coconut trees. Reni and Roeton, on the north-eastern part of the reef, are low sandy islets, on each of which are some houses and coconut plantations, and a conspicuous square tree in the middle. Kanobé, 198 feet (60^m3) high and wooded, lies on the north-western part of the 10 reef, and is uninhabited. Mios Mandoeng, about 1½ miles north-north-westward of Kanobé, is partly rocky and partly sandy, with some houses and coconut trees on it.

The lagoon, which is entered on the north-western side of the reef, is accessible for a vessel with a length of 180 feet (54^m9), and a draught of 15 11 feet (3^m4), when the reefs are plainly visible. The in-going tidal stream has a rate of about 5 knots in the entrance, and about a quarter of an hour after low water sets strongly over the reefs in all directions; in the channel the stream continues until high water, and then after a short period of slack water, it sets out, but not so strongly as on the 20 in-going stream.

On the northern side of the entrance to the lagoon there are some conspicuous black rocks which are usually uncovered. A temporary anchorage may be obtained by vessels with local knowledge in the entrance to the channel, but a better anchorage out of the influence of 25 the tidal stream, is in a depth of 18 fathoms (32^m9), close southward of the inner end of the channel. Anchoring in the channel is dangerous.

Navigation must be carried out by eye, which is not difficult if the vessel is conned from aloft. There is a detached reef, with a depth of 6 feet (1^m8), barely marked by discoloration, on the southern side of the 30 entrance, and a 13-foot (4^m0) patch in the middle of the channel about 1½ miles within the entrance. Vessels should not enter or leave the lagoon during the strength of the tidal stream at springs.

Budd.—Budd or Moff is a low uninhabited islet, covered with trees, lying about 23 miles westward of Abdon. 35

Chart 3745.

WAIGEO.—This island, situated north-westward of the western extremity of New Guinea, is almost entirely occupied by mountainous and hilly land, which slopes down to its coast without any beach. Serodjil (Seroyil), 3,078 feet (938^m2) high, in the form of a sugar-loaf, 40 lies on the northern side of the island, about 15 miles from the western end. Buffelhoorn (*Lat.* 0° 05' S., *Long.* 130° 45' E.), 3,140 feet (957^m1) high, lies about 14 miles eastward of Serodjil, and is very conspicuous, its steep horn-shaped summit showing above the adjacent mountains. The whole island is clothed with dense forest. See views facing this 45 page.

Western side of Waigeo.—**Coast.**—The west coast is high, and fringed mostly by a narrow, steep-to coral reef. Aljoei (Alyui) baai has two entrances, separated by a group of islands, and in its inner-part is entirely landlocked. The southern entrance lies between Tanjong Sel 50 Pele, the western extremity of Waigeo, and Cape D'Entrecasteaux, about 1½ miles north-north-westward. Cape D'Entrecasteaux is the western termination of the westernmost island of the group which

Chart 3745.

separates the two entrances of Aljoei baai, and rises to an elevation of 916 feet (279^m2).

Groote Tafelberg, 1,592 feet (485^m3) high, and Kleine Tafelberg, 1,441 feet (439^m2) high, lie about 7 miles east-south-eastward and 9 miles eastward, respectively, of Tanjong Sel Pele. Waisilip, 1,014 feet (309^m1) high, lies about 2 miles south-eastward of Groote Tafelberg, and appears isolated from south-westward.

On the northern side of the northern entrance there are two 4-fathom (7^m3) patches, and a reef extends from the southern shore. The southern entrance to the outer part of the bay is clear. On the northern side of the entrance to the inner part there is a shoal with a depth of 2 fathoms (3^m7), and on the southern side there is a reef which dries; the navigable channel here has a width of about 2 cables with a least depth of 6½ fathoms (11^m9).

There is also a passage southward of the island which separates the inner from the outer part of the bay, in which there is a least depth of 6½ fathoms (11^m9).

A shoal, with a depth of 4½ fathoms (7^m8), lies about 2 cables northward of the island lying in the middle of the inner part of the bay.

Except for the inhabitants of Sel Pele village, situated close within Tanjong Sel Pele, and a Papuan settlement on the northern side of the entrance of the outer part of the bay, none were seen in 1918.

Off-lying islands and dangers.—Mé, 761 feet (232^m0) high, lies close offshore 5 miles north-north-eastward of Cape D'Entrecasteaux. A rock, with a depth of 2 feet (0^m6), lies about one mile northward of Mé, and close southward of the rock there is a boulder, which dries.

Southward of Tanjong Sel Pele (*Lat. 0° 13' S., Long. 130° 13' E.*) there is a group of islands, of which Batang Pele, 1,204 feet (367^m0) high, which is conspicuous, and Minjai Foen (Minyai Fun) are the largest. War Parear village, on the northern side of Minjai Foen, is the only permanent settlement on the islands. Anchorage may be obtained by vessels with local knowledge, in a depth of about 14 fathoms (25^m6), sand, off this village. A vessel approaching it either from eastward or westward should follow the coast of Minjai Foen at a distance of about one cable. Djoe (Ju) is an island lying about 1½ miles westward of Minjai Foen; about 2½ miles north-westward of Djoe is a shoal, with a least depth of 4 fathoms (7^m3).

Gemien, 738 feet (224^m9) high, lies close offshore about 15 miles eastward of Batang Pele. Between these islands there are many islets and dangers, the positions of which may best be seen on the chart. Of these, Fwojo (Fwoyo), about 3 miles southward of Minjai Foen, Jef (Yef) Tsiep, about 3½ miles east-south-eastward, Moetoës Besar (Mutus islands) and Moetoës Kechil, about 7 miles eastward of Minjai Foen, are low coral islets. There are coconut plantations on Jef Kaboe (Yef Kabu) and Mios Arar, situated about one mile and 4½ miles, respectively, south-westward of Moetoës Kechil. Biantjsi Besar, 445 feet (135^m6) high, lies 6½ miles eastward of Batang Pele.

Jeben and Apibok are rocky islets, with a reef, which dries, about midway between them, lying about 4 and 6 miles, respectively, west-north-westward of the south-western extremity of Gam (page 200).

Coast.—Between Tanjong Manare, about 7 miles east-south-eastward of Tanjong Sel Pele, and the north-western extremity of Gam, 13½ miles south-eastward, there is a large bight, in the north-eastern

Chart 3745.

corner of which is Waisai baai, in which good anchorage may be obtained off Waisai village.

Waisai and Waiwoom (Waiwum), about 4 miles southward, are the only two villages on the south-western coast of Waigeo. If bound for Waisai baai from southward, a vessel may pass on either side of Peniki, an islet lying about $4\frac{1}{2}$ miles south-westward of Gemien. The reef about midway between them is not well marked by discoloration. Great caution is necessary when proceeding through the channels between the islands. 10

Anchorage may be obtained in Warparim baai, on the north-western side of Gam. A vessel approaching this anchorage should pass close to Tanjong Omrab, the north-western point of Gam, on account of numerous shoals northward and north-westward of that point.

Northern side of Waigeo.—Except in the bays, the northern coast of Waigeo is mostly rocky, and in some places rises vertically from the sea; the entire coast westward of Fofak baai is steep. There are several good anchorages, the most sheltered of which is in Fofak baai. The coast is sparsely populated, the only village being in Kabarei baai. 15

Mané Tep baai, situated close eastward of Mé (page 196), affords 20 anchorage, in depths of from 20 to 25 fathoms (36^m6 to 45^m7), coral and sand. The entrance is clear of dangers on its eastern side. A stream flows into the bay at the eastern end of the sandy beach.

Telok Woenoh (Wunoh) is separated from Mané baai by a tongue of high land, rising steeply from the sea, eastward of which is a convenient anchorage. Southward of the anchorage, a pinnacle rock lies about a quarter of a cable offshore. 25

The high island of Woenoh fronts the bay, with rocks above and below water, between it and the coast southward; these rocks above water are covered with vegetation. 30

Chart 1416, plan of Saripa bay.

Saripa baai.—Saripa baai is separated from Telok Woenoh by a narrow, steep, and moderately high, tongue of land, from the northern end of which, rocks above water, extend 3 cables north-westward.

The entrance to the bay, which is about half a mile wide, lies between these rocks and others, which extend about 6 cables north-westward from Sipsipa, an islet lying close off the eastern entrance point. See view facing page 195. There are some islets on the shore reef near the head of the bay. Small vessels may obtain anchorage in the inlet, at the eastern side of the entrance to the bay. 40

Chart 3745.

Off-lying islands and dangers.—Seprang (*Lat. $0^{\circ} 01' S.$, Long. $130^{\circ} 18' E.$*) is a group of rocky islets, the western and highest of which has an elevation of 122 feet (37^m2), lying $5\frac{1}{2}$ miles north-north-eastward of Mé. Loh Loh or De Knoopen consists of six low rocky islets in two groups lying about 6 and 8 miles, respectively, eastward of Seprang Schoen, an island, highest at its eastern end, lies close off the coast, $4\frac{1}{2}$ miles eastward of Loh Loh. Arago baai, entered between the eastern eastern extremity of this island and Kaap Arago, $2\frac{1}{2}$ miles eastward, has some rocks above water in its entrance. 50

Chart 1416, plan of Fofak harbour.

Fofak baai.—This bay is entered between Hoek Forrest, about 22 miles eastward of the entrance to Saripa baai, and Rotsige hoek, about three-quarters of a mile farther eastward. About 2 cables

Chart 1416, plan of Fofak harbour.

north-north-westward of Rotsige hoek, there are some rocky islets, shaped like beehives, and on the eastern side of the entrance are Lélédé, some rocks above water. On the southern side of the bay, southward of the entrance, is an islet, connected to the shore by a reef. A reef also extends about 2 cables from its western side, forming a cove southward of it, in which anchorage may be obtained, in depths of from 12 to 20 fathoms (21^m9 to 36^m6), mud. A 15-foot (4^m6) patch lies 4½ cables eastward of this islet. A rock awash lies about one mile south-westward of Hoek Saine, the northern entrance point of the western arm of the bay.

Delphine and Eugénie are islets lying on the edge of a mudbank which extends from the head of the bay. Vessels should not proceed eastward of these islets.

15 *Chart 3745.*

Off-lying islands.—Manoeran (Manuran), 975 feet (297^m2) high, lies about 2 miles offshore and 8½ miles east-north-eastward of Rotsige hoek. (See view facing page 195). A reef, with a depth of 2½ fathoms (5^m0), lies about half a mile off its south-eastern side.

20 *Chart 1416, plan of Lawak and Kabarei bays.*

Lawak, an island, 620 feet (189^m0) high, lies close offshore, 3 miles south-eastward of Manoeran; it is separated from the coast of Waigeo by a navigable channel about 1½ cables wide, with a least depth of 6½ fathoms (11^m9) in the fairway, but there is a 3-fathom (5^m5) patch in the middle at the north-eastern end of the channel.

Anchorage.—**Dangers.**—Anchorage may be obtained during the southerly monsoon, between Lawak and Tanjong Wariai (chart 3745), 5½ miles eastward, in any required depth.

Kabarei baai, entered between a point half a mile eastward of Lawak, south and Hoek Berard, about one mile farther eastward, is open northward. There is a village at the head of the bay, which is shallow.

Chart 1416, plan of Boni harbour.

Boni (Lat. 0° 03' S., Long. 131° 04' E.), a low islet, covered with high trees, lies about 1½ miles south-eastward of Tanjong Wariai. A reef extends about 1½ miles from its northern side and about 1½ miles from its eastern side. Between Boni and the coast of Waigeo there is a channel, with a least depth of about 9 fathoms (16^m5) in the fairway, in which anchorage may be obtained over mud and sand, but there is foul ground off the coast forming the southern side of the channel southward of Boni.

The eastern approach to this anchorage, between the reef extending eastward from Boni and Bombédari, a low islet, covered with vegetation, lying close off the coast of Waigeo, 1½ miles south-eastward of Boni, is deep and about half a mile wide. The narrow channel between Bombédari and the coast of Waigeo is encumbered with rocks.

A reef, with a depth of 3 fathoms (5^m5), lies in the northern approach to Boni, about 3 miles north-north-westward of Tanjong Wariai.

Chart 3745.

Coast.—Between Tanjong Saobas, about 7½ miles south-eastward of Tanjong Wariai, and Hoek Lamarche, a low point, about 10 miles farther south-eastward, the coast is fringed by a reef, and there is no anchorage. The coast is low, with fairly conspicuous mountains farther inland. Zadelberg, 2,271 feet (692^m2) high, lies about 8½ miles southward of Tanjong Saobas. Poepri (Pupri), 857 feet (261^m2) high,

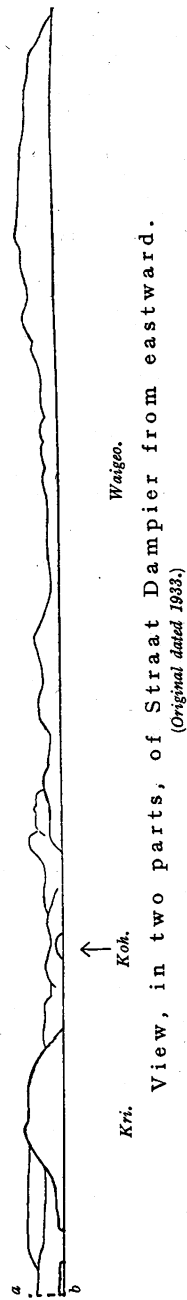
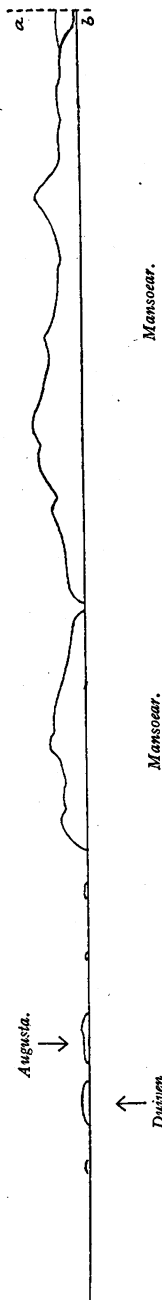
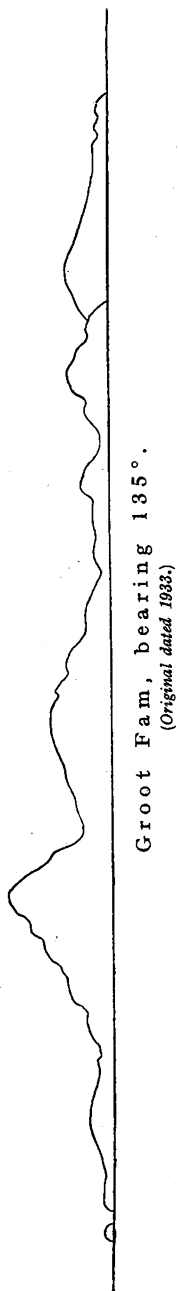


Chart 3745.

and conspicuous, lies about one mile southward of Hoek Lamarche.

The southern side of Waigeo is described on page 200.

STRAAT DAMPIER.—This strait lies between the southern side of Waigeo and Batanta. The main channel is between the islands 5
Mansoeur, Kri, and Koh, situated about 3 miles southward of Gam (page 200), on the north, and the islets Augusta and Duiven on the south. There is a safe channel southward of Duiven, and another along the northern side of Batanta. See views facing this page and page 201.

Tidal streams.—In the western approach to Straat Dampier 10
between Kofiau (page 104) and the western end of Batanta, there is frequently a south-going stream from September to April, but the streams are greatly affected by the direction and force of the wind. From May to August the stream here sets north-west and north, whilst there is little or no stream during the transition months. 15

In the height of the North-west monsoon, in the narrow part of the strait, between Duiven and Djerief, the stream at springs sets east-north-eastward for 6 or 8 hours, at the rate of 4 to 5 knots, and from one to 3 knots at neaps during the falling tide, and sets south-westward for 3 or 4 hours, during the rising tide, but is weak. During the height 20
of the South-east monsoon, from May to September, in this part, the stream sets westward for 8 or 10 hours, during the rising tide, turning gradually to south-west by south; it then attains its greatest rate, which at springs, sometimes exceeds 5 knots, and at neaps, 4 knots. The stream during the falling tide at this season, sets east-north-east 25
or north-east, and is neither strong nor of long duration; however, a rate of 4 knots, during one or 2 hours, has been observed.

The stream during the falling tide is usually strongest at the eastern entrance to the strait in both monsoons, and during the South-east monsoon an easterly stream sometimes runs for two or three days 30
together.

Islands and dangers.—Jef (Yef) Fam consists of two groups of islands, situated in the western approach to Straat Dampier.

Groot Fam or Penemoe, the largest of the northern group, is 700 feet (213^m4) high at its north-western end, and is very steep. (See view 35
facing this page.) There are no permanent inhabitants on this island. A 4½-fathom (8^m2) patch lies 3½ miles westward of the southern extremity of Groot Fam. Keroeo (*Lat.* 0° 35' S., *Long.* 130° 18' E.) is the largest of the rocky islets lying within one mile eastward of the 40
southern part of this island.

The channels between Groot Fam and Jeben (page 196), about 6 miles north-eastward, and between Groot Fam and Fam, about 2½ miles southward, are clear of dangers.

Fam, the largest and northernmost of the southern group, is 453 feet (138^m1) high, near its western end, and is conspicuous owing to its flat 45
summit; at the eastern end of the island there are two hills of about the same elevation. Mingiman and Jar (Yar), at the south-western end of the group, are, like the islands between, low coral islands with high trees on them. A 2½-fathom (5^m0) patch lies about 2½ miles eastward of Fam and a 1½-fathom (2^m7) patch lies about one mile southward of 50
Mingiman. These shoals and several others around the group, the positions of which may best be seen on the chart, are mostly well marked by discoloration.

Chart 3745.

Anchorage may be obtained in a few places in the southern group. There is a small village on the southern side of Fam. The tidal streams may attain a rate of from 2 to 3 knots.

- 5 Woodford rифfen, about $7\frac{1}{2}$ miles east-south-eastward of Fam, consist of three rocky patches, with depths of 3 and $3\frac{1}{2}$ fathoms (5^m5 and 6^m4) over them; they are only slightly marked by discoloration.

- Augusta and Duiven are low flat islets with high trees on them, lying within the western edge of a ridge, which extends east-south-
10 eastward towards the eastern end of Batanta. Although the channel between the two islets is deep, vessels are recommended not to use it on account of the strong tidal streams. Two 5-fathom (9^m1) patches lie about 2 miles westward and one mile north-westward, respectively, of Augusta and also within $1\frac{1}{2}$ miles eastward of Duiven.

- 15 Djerief (Jerief), on the south-western extremity of a reef, which dries, about 7 miles east-south-eastward of Duiven, is low and flat, with high trees on it. Reefs, which dry, lie within 5 miles west-south-westward of Djerief. Mansfield islets consist of three flat islets, lying on drying
20 reefs, about 4 miles eastward of Djerief; there are some high trees on the north-easternmost islet. The large reefs, which dry, are marked by discoloration. Several shoals, with depths of from 4 to $5\frac{1}{2}$ fathoms (7^m3 to 10^m1), lie within 3 miles north-westward and north-eastward of Djerief. See view facing page 201.

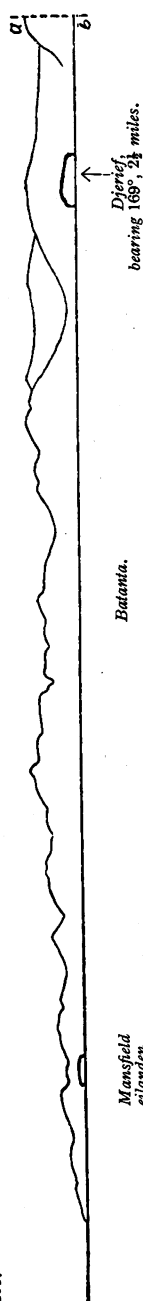
- The area between the reefs on which Djerief and Mansfield islets lie
25 should be avoided, as unknown dangers may exist.

- Mansoeear has three inconspicuous peaks, the highest of which has an elevation of 1,253 feet (381^m9), situated about the middle of the island; near the eastern end there is a more conspicuous peak, 853 feet (260^m0) high. The southern coast, which rises steeply from the sea, is clear of
30 dangers. (See view facing page 199). Kri, 702 feet (214^m0) high, and Koh, 132 feet (40^m2) high, lie close north-eastward of Mansoeear. Kri is connected to Mansoeear by a reef, on which there is an islet; there is no passage between Kri and Koh. A shoal, with a depth of 11 feet (3^m4), lies about $1\frac{1}{2}$ miles north-eastward of Koh (*Lat.* $0^\circ 33' S.$,
35 *Long.* $130^\circ 41' E.$).

- The passage between Mansoeear and the southern side of Gam, about 3 miles northward, is much encumbered with reefs which dry and detached shoals, the positions of which may best be seen on the chart. Aierborei (Aierborei) is an islet lying near the western edge of one of
40 these reefs, about $3\frac{1}{2}$ miles north-westward of the western extremity of Mansoeear.

- Southern side of Waigeo.—Coast.**—Gam, separated from the southern side of Waigeo by Straat Kaboei, is 1,326 feet (404^m1) high in its north-eastern part; about $2\frac{1}{2}$ miles southward of its summit there
45 is a conspicuous peak, 968 feet (295^m0) high. The west coast is steep, and the south coast rises sheer from the sea. There is a village on Tanjong Besir, the eastern entrance point of a bay on the southern side of the island, and another about one mile south-westward of Tanjong Jennanas (Yenanas), the eastern extremity of the island.

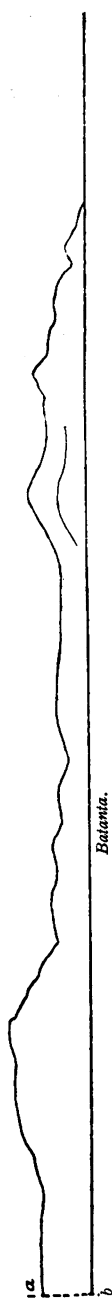
- 50 Keroepiar, a rock 30 feet (9^m1) high, lies about one mile off the south-eastern side of Gam, $4\frac{1}{2}$ miles south-south-westward of Tanjong Jennanas. Camphuys or Mios Kon, 135 feet (41^m1) high, lies $3\frac{1}{2}$ miles south-eastward of the same point. Friwinbonda and Friwin are islets, 30 feet (9^m1) high, lying about $1\frac{1}{2}$ miles southward of Tanjong Jennanas.



Batanta.

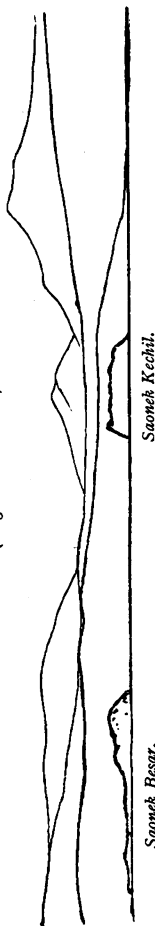
Mansfield
eiland.

Djerif
bearing 168°, 2½ miles.



Batanta.

Straat Dampier.—View, in two parts, of the north coast of Batanta.
(Original dated 1933.)



Saonek Besar.

Saonek Kechil.

South coast of Waigeo.—Saonek Besar and Saonek Kechil from southward.
(Original dated 1933.)



Entrance bearing 316°.

South coast of Waigeo.—Entrance to Majalibit baai from south-eastward.
(Original dated 1933.)

Chart 3745.

Straat Kaboei is a very narrow channel with a least depth of 5 feet (1^m5), and is only available for small craft with local knowledge. The tidal stream in the strait sometimes attains a rate of 4 knots, and causes tide-rips and whirlpools.

Kaboei baai is formed between the northern coast of Gam and Waigeo. The eastern entrance between Tanjong Jennanas and the coast of Waigeo north-eastward, is about 1½ miles wide and deep, but narrows to one mile abreast Oera (Ura), an islet, 410 feet (125^m0) high, about 1½ miles within; there may be a strong tidal stream in this channel. There are several Papuan settlements on the shores and on the islets in the bay.

Chart 1416, plan of Saonek anchorage.

Reede Saonek.—Saonek Besar, 145 feet (44^m2) high, covered with vegetation, and Saonek Kechil, 230 feet (70^m1) high, and wooded, lie about 5½ miles east-south-eastward and 6½ miles eastward, respectively, of Tanjong Jennanas. Except on the north-western side, where Saonek village is situated, Saonek Besar is fringed by a reef, which extends 2 cables from its western side, and is marked by discoloration. See view facing this page.

A reef, with a depth of 12 feet (3^m7), lies 1½ miles north-westward of Saonek Besar, and is marked by discoloration.

There is a boat pier at Saonek village, and two small piers for the use of praus, westward of it.

Anchorage may be obtained, in a depth of about 16 fathoms (29^m3), sand, on the line of the prolongation of the boat pier. A vessel intending to remain a long period should moor.

Chart 3745.

Coast.—The coast of Waigeo, from abreast Saonek Besar to the entrance to Majalibit baai, a distance of about 10 miles, is moderately low, thence for 9 miles eastward it rises steeply, after which it again becomes low. A conical peak, 1,483 feet (452^m0) high, about 4½ miles north-eastward of Saonek Kechil (*Lat. 0° 27' S., Long. 130° 41' E.*) and a round mountain, 2,054 feet (626^m1) high, about 5 miles northward of the peak, are conspicuous. About 6 miles east-north-eastward of the round mountain, on the eastern side of Majalibit baai, there is a range with five peaks, lying in a northerly and southerly direction. An isolated mountain, 1,168 feet (356^m0) high, rises close to the coast where the high land ends, about 14 miles westward of Tanjong Momfafa, the eastern extremity of Waigeo. About 8 miles farther east-south-eastward is a conspicuous mountain, 1,605 feet (489^m2) high, lying about 1½ miles within Tanjong Imbikwan. Zadelberg, about 10 miles northward of Tanjong Imbikwan, has been described on page 198.

Majalibit baai, entered about 16 miles east-north-eastward of Tanjong Jennanas, extends north-westward to within less than 2 miles of the northern coast of the island. The bay has not been surveyed, and owing to the narrow entrance, in which there are heavy tide-rips and strong tidal streams, the bay is inaccessible for vessels. See view facing this page.

Siam rivier, probably the largest in Waigeo, flows out on the eastern side of the bay in the vicinity of Tanjong Siam, a low point about 12 miles within the entrance; the river is about a quarter of a cable wide and flows rapidly. Noe, an inhabited island, lies near the

Chart 3745.

southern end of the bay, and the Kaiawat rivier, which is about 75 yards (68^m6) wide at its mouth, flows out on the western side. About 6 miles within Tanjong Siam is Bé, the largest of a number of steep islets which lie across the fairway. At the head of the bay there are three bights, the two western of which are separated by a narrow peninsula. There are several small villages on the shores of the bay.

Memjai, an islet, 437 feet (133^m2) high, and covered with vegetation, lies about 14 miles eastward of the entrance to Majalibit baai and about half a mile offshore. Wajam (Wayim) is a low islet with high trees, lying about one mile southward of Tanjong Imbikwan; a reef, on which there is a sandy patch above water, extends north-eastward from the eastern extremity of the islet. Tanjong Momfafa is low at its extremity, but rises to hilly land within.

Off-lying dangers.—A ridge of reefs extends along the southern coast of Waigeo, from a position about 4 miles eastward of Saonek Besar to about 1½ miles westward of Memjai, from about 1½ to 3 miles offshore; there are many patches, which dry, and some covered with vegetation. There is a gap in the ridge southward of the entrance to Majalibit baai, but in the middle of it there is a 2-fathom (3^m7) patch, only slightly marked by discoloration at times. There is another gap about 3 miles southward of Wakré village, situated on the main island about 2½ miles north-north-westward of Memjai. A vessel should not enter unless the reefs are plainly visible; a rock, which dries, lies about three-quarters of a mile south-westward of the village.

Another ridge extends parallel with the coast from 5 miles westward to 5 miles north-eastward of Wajam. There are some patches, which dry, on the western edge of this ridge, one of which is composed of bright white sand, and just before low water, is divided into two separate parts.

Batanta.—This island, on the southern side of Straat Dampier, consists of a chain of densely wooded mountains; Batanta (*Lat.* 0° 52' S., *Long.* 130° 36' E.), its summit, attains an elevation of 3,508 feet (1069^m2). See views facing pages 201 and 203.

The northern coast is formed by spurs from the mountains, between which lie bays with considerable depths, in some places only separated from one another by a chain of reefs. Except for the westernmost bay, this coast affords good anchorages for vessels with local knowledge, where they can lie completely sheltered, but there are no conspicuous marks for approaching them. There are a few small scattered villages.

Off-lying danger.—Batanta rif is the eastern extremity of the ridge which extends across Straat Dampier from Augusta and Duiven (page 200). Between Mansfield islets and Batanta rif there are several patches, with depths of from 2 to 5 fathoms (3^m7 to 9^m1), and the least depth on Batanta rif is 2½ fathoms (4^m6), situated about 5½ miles eastward of Tanjong Evanias, the eastern extremity of Batanta.

Directions for Straat Dampier.—A vessel approaching Straat Dampier from westward should steer for the high north-western extremity of Batanta, keeping well southward of the Jef Fam group, thence, if intending to use the main channel (page 199), should steer for the western extremity of Mansoea, bearing 036°, or the 610-foot (185^m9) hill, situated on the north-western extremity of Batanta, astern, bearing 203°, which leads between Woodford riffs and the shoals westward of Augusta. When the eastern extremities of Augusta

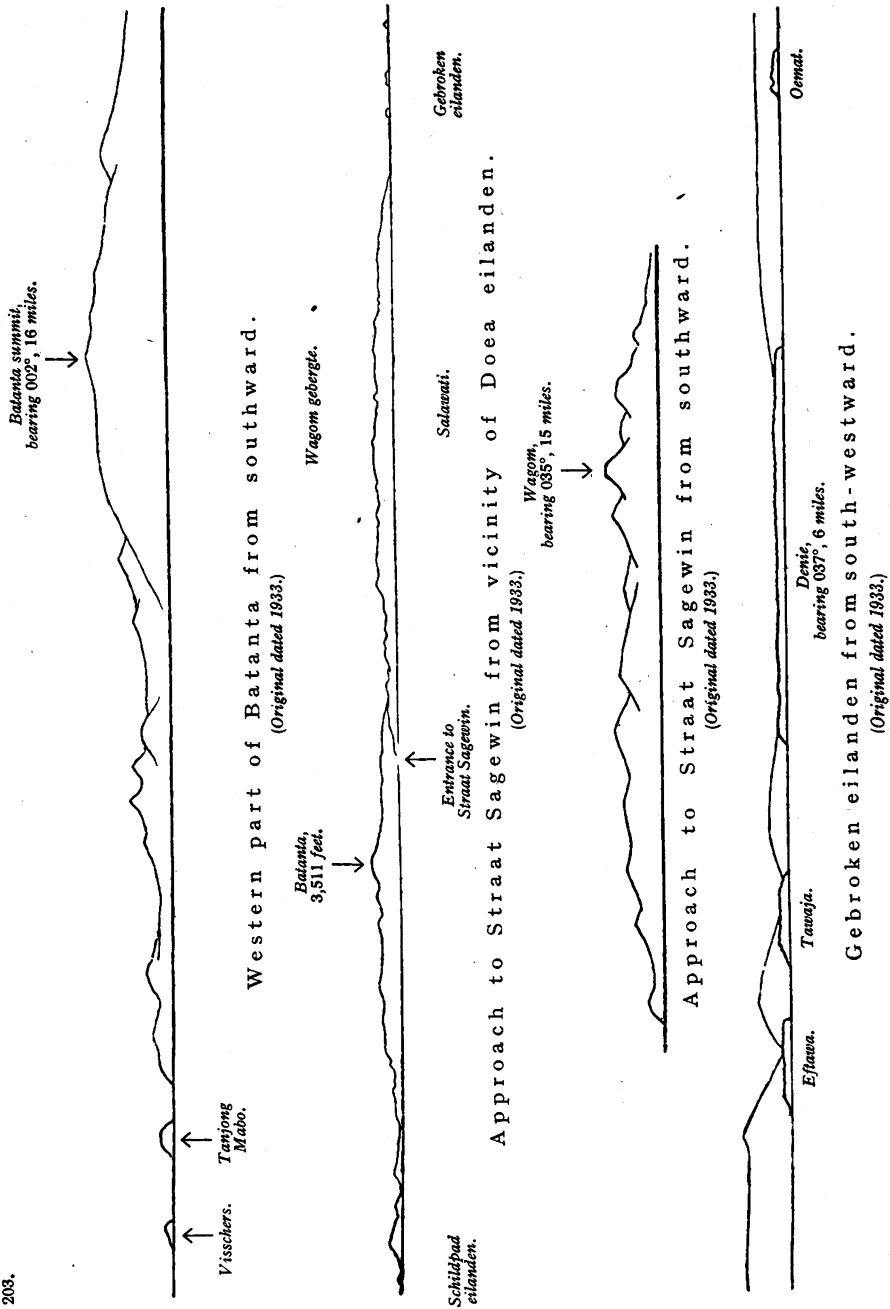


Chart 3745.

and Duiven are in line, bearing 108° , she should alter course to 070° , passing southward of Mansoear, Kri and Koh.

If proceeding to Reede Saonek, the vessel should pass well eastward of the 15-foot (4^m6) shoal, situated $1\frac{1}{2}$ miles north-eastward of Koh. 5
Saonek Besar may be passed on either side, but, if proceeding westward of it, the reef extending westward from that side of the island must be given a good berth.

A vessel may use the channel southward of Augusta and Duiven. When Camphuys is seen midway between Kri and Koh, bearing 028° , 10 she may alter course on to this alignment, which will lead, in depths of from 6 to 7 fathoms (11^m0 to 12^m8), eastward of the ridge extending from Duiven, or if a greater depth is required, after passing between the north-western extremity of Batanta and Woodford raffen, she should steer eastward and pass in mid-channel between Duiven and the reefs 15 westward of Djerief, and she should not alter course northward, until the hill, situated $3\frac{1}{4}$ miles north-north-westward of Saonek Besar, is in line with the north-western side of Camphuys, bearing 023° . A vessel approaching from eastward should bring these marks on astern in good time, and keep them on until the eastern extremities of Duiven and 20 Augusta are in line, bearing 288° , when she may steer through the clear passage northward of the north-western extremity of Batanta.

A vessel proceeding through the channel along the northern coast of Batanta should keep northward of the line joining the northern extremities of Dajang (Dayang) and Wroewarez (Wruwarez), situated 25 about $2\frac{1}{2}$ and 20 miles, respectively, east-north-eastward of the north-western extremity of Batanta; thence keep close outside the salient points to avoid the detached shoals northward, until Tanjong Kandorwa, the south-eastern extremity of Batanta, is in line with the eastern extremity of Ajemi (Ayemi) (page 204), bearing about 211° , 30 which, if kept in line astern, will lead over the ridge north-westward of Batanta rif. If proceeding southward, after rounding Tanjong Evanäs (*Lat. $0^{\circ} 47' S.$, Long. $130^{\circ} 55' E.$*), the vessel may proceed southward to the deep channel eastward of Straat Sagewin.

STRAAT SAGEWIN.—This strait, between the southern side of 35 Batanta and Salawati, is a deep and safe channel for steam vessels; both sides of the strait are steep-to. Both entrances are frequently obscured by heavy showers of rain, so that caution should be exercised when navigating the strait at night. See views facing this page.

Visschers eiland, a rocky and wooded islet, 213 feet (64^m9) high and 40 steep-to, lies about $1\frac{1}{4}$ miles westward of Tanjong Mabo, the western extremity of Batanta. This cape, which is 325 feet (99^m1) high, is the termination of a low neck of land, and from a distance appears as an islet.

Sagewin, a hilly island, lies close northward of Tanjong Dadi, the north-western extremity of Salawati, with a clear deep channel between. 45



Two peaks south-east of Wagom, bearing 072° ,
17 miles.

(Original dated 1933.)

There is a village, with some conspicuous coconut trees, on the north-western extremity of Sagewin. The north-western part of

Charts 942b, 2759a, 1263.

Chart 3745.

Salawati is mountainous, attaining an elevation of 2,969 feet (904^m9), about 8 miles eastward of Tanjong Dadi, its north-western extremity. About one mile south-eastward of the summit is Wagom, and 5½ miles farther south-eastward are two peaks 820 feet (249^m9) high.

Djodlo (Jodlo) village, on the northern side of the strait, about 4½ miles west-south-westward of Tanjong Kandorwa, is the only settlement of any importance. Jef (Yef) Doif or Snapan, an islet, 558 feet (170^m1) high, lies about one mile northward of Tanjong Majasalava, the north-eastern extremity of Salawati, to which it is connected by a shallow ridge. A reef, on which there are two rocks, which dry, lies about 1½ miles westward of the southern extremity of Jef Doif.

Anchorages.—Anchorage may be obtained, in a depth of about 25 fathoms (45^m7), about one cable offshore, off the south-eastern extremity of Sagewin, but the tidal streams here may attain a rate of from 3 to 4 knots, probably at about high and low water. Vessels may obtain anchorage in the same depth, over a sandy bottom, about 1½ cables offshore, off Tipin village, westward of a rivulet, on the southern side of the strait about 8½ miles eastward of Tanjong Dadi; the coast here is lower than elsewhere, and is covered with coconut trees; there is a depth of about 15 fathoms (27^m4), about three-quarters of a cable offshore.

Good anchorage may be obtained during the South-east monsoon, in a depth of about 27 fathoms (49^m4), sand, off the mouth of a rivulet which flows out into the south-western corner of the bight on the northern side of Salawati, about 6½ miles westward of Tanjong Majasalava.

Chart 1416, plan of Marchesa bay.

Marchesa baai, entered between Tanjong Kandorwa and Tanjong Makoi, about 2½ miles north-eastward, affords a safe anchorage at its head, in depths of from 16 to 22 fathoms (29^m3 to 40^m2), mud and sand. Large vessels should enter northward of Ajemi (Ayemi), an islet lying in the entrance, and steer for Maribio, a conspicuous islet at the head of the bay. The entrance southward of Ajemi (*Lat.* 0° 49' S., *Long.* 130° 54' E.) is only suitable for small vessels when the reefs are plainly visible. Mesawai, an islet on the southern side of the bay, is surrounded by foul ground.

Charts 3744, 3745.

SALAWATI.—The greater part of this island is occupied by very low land, with jungle difficult to penetrate. The principal villages on the coast are Samate, on the north-eastern side, and Sailolof, on the south-western side, situated, respectively, 26 miles eastward and 18 miles south-south-westward of Tanjong Dadi.

The islets lying off the west coast of Salawati are low, thickly covered with vegetation, and lie on long narrow ridges running parallel to the coast. On the outer ridge are the Kaboe eilanden, wooded with high trees, about 10½ miles south-south-westward of Tanjong Dadi, and Loslos about 7 miles southward of them.

Chart 3744.

About 6 miles southward of Loslos, is a stony patch, over which there is a depth of 16 feet (4^m9), and which, owing to the greenish colour of the water in this vicinity, is not well marked by discoloration.

[Charts 942b, 2759a, 1263.]

Chart 3744.

The two Mokon islets, Jef (Yef) Danya and the Gebroken eilanden (see view facing page 203), lie on the next ridge eastward, the northern portion of which is separated from the Kaboe eilanden (see view facing page 209) by a deep channel. Farther inshore, are several other ridges with islets on them, also many detached shoal patches; the positions or all these can best be seen on the chart. 5

Sailolof village consists of a long row of houses on piles on the beach, with numerous coconut trees in the vicinity.

Anchorage may be obtained off this village, in a depth of 6 fathoms (11^m0), with the mosque bearing 054°, and the south-western extremity of Tjoen (Chun), an islet lying nearly one mile westward of the village, in line with Bodo, an islet, bearing about 292°. 10

A vessel approaching from westward or south-westward can pass close southward of the Gebroken eilanden and then steer for Tjoen until the mosque bears 054°. A vessel from northward, after rounding Loslos, should bring that islet astern on a westerly bearing and steer for Oemien (Umien), an islet situated about 1½ miles west-south-westward of Tjoen, passing well southward of it, and thence steer for the mosque in Sailolof, bearing 054°. 15 20

Outlying islands and dangers.—Noesela (Nusela) eilanden consist of a group of islands, the largest of which is Weeim or Babi, lying about 12 miles north-north-westward of the northern extremity of Misool. The position of the shoals in the vicinity of these islands may best be seen on the chart. 25

Schildpad eilanden are a group of eight low islands, densely wooded with high trees, lying about 15 miles north-north-eastward of the northern extremity of Misool. The outer islets should be given a berth of at least 2 miles.

Hesketh reef, with a depth of 16 feet (4^m9), rock, lies about 3½ miles south-westward of Kamoeai, the westernmost island of the group, and a 16-foot (4^m9) patch lies about 3 miles farther south-westward. 30

Doea eilanden consist of two islets thickly covered with high trees and fringed by a reef, lying about 5 miles south-south-eastward of Schildpad eilanden. A 4-fathom (7^m3) patch lies about 2 miles westward of the northern of the Doea eilanden. Magdal riffen are two dangerous reefs, which can seldom be discerned by discoloration, with a least depth of 6 feet (1^m8), lying about 4 miles north-north-eastward of Doea eilanden. 35

Zeemeeuw riffen (*Lat.* 1° 20' S., *Long.* 130° 30' E.), about 12 miles westward of Gebroken eilanden, dry only at low water, when there is frequently surf over them. The tidal streams in this vicinity are irregular. 40

Charts 1416, 3744.

STRAAT SÉLÉ.—This passage between Salawati and the western extremity of New Guinea, is little used; navigation in it, however, is not difficult. 45

All the islands in the strait, except Doom and Matan, at the northern end of the strait, are low, but are covered with high trees. The shores of the strait are low and wooded. The reefs are only slightly marked by discoloration. On the north-eastern side of Salawati are Waiwo and Samate villages, and on the southern side about 2 miles north-westward of Tanjong Kamjolo, the western entrance point, is Saileen 50

Charts 3745, 3242, 942b, 2759a, 1263.

Charts 1416, 3744.

village. On the New Guinea coast are Seget village, about 3 miles north-eastward of Tanjong Sélé, a rocky point, about 30 feet (9^m1) high, covered with high trees, the eastern entrance point of the southern end of the strait, and a settlement about 6 miles farther northward abreast Jef (Yef) Kasim. Elsewhere the shores are uninhabited.

Chart 1416.

Reede Samate and approaches.—This roadstead, situated northward of Samate village, lies between Tanjong Majasalava and the Rombombo eilanden, eastward of it. Bam is a high rocky islet lying on the outer edge of a drying reef which extends from Salawati, about 2½ miles south-eastward of Tanjong Majasalava. Katapatjan, a rock above water, lies on the eastern side of the roadstead, on the edge of the extensive drying reef, which extends from the western side of Rombombo eilanden.

There are several reefs in the northern approach to Reede Samate, the positions of which may best be seen on the chart.

Anchorage may be obtained, in a depth of 6½ fathoms (11^m9), hard bottom, about 7 cables eastward of Bam. A vessel approaching from northward, should steer for Matan, an islet, 279 feet (85^m0) high, about 2¼ miles south-eastward of Efman, the north-eastern of the Rombombo eilanden, bearing 180°, until Tanjong Sorong, the eastern entrance point of the northern end of Straat Sélé, bears 090°, when she should steer for Jef Doif (page 204), bearing about 241°. When Bam bears about 169°, she should steer for it on that bearing until Katapatjan is in line with the north-eastern extremity of the southern of the Rombombo eilanden, bearing 097°, when she should alter course gradually eastward and anchor when Katapatjan is in line with the southern extremity of Efman, bearing about 086°. The detached reef, with a depth of 16 feet (4^m9), situated about 1¼ miles east-north-eastward of Bam, is marked by discoloration and slight breakers.

There is always a north-easterly swell in the roadstead, so that vessels may roll heavily even in the finest weather.

Samate village, the headquarters of the Rajah of Samate, consists of dwellings on piles; there is a strip of sand about 100 feet (30^m5) wide.

Reede Sorong and approaches.—**Light.**—**Beacon.**—This roadstead is situated on the eastern side of Straat Sélé, about 4 miles southward of Tanjong Sorong. Sorong village, the headquarters of a Government official, is situated on the eastern side of Doom (Dom), an islet lying about half a mile south-south-westward of Tanjong Noejew (Nuyew), situated 3½ miles southward of Tanjong Sorong. There is a small landing pier at the village.

The limits of the roadstead are the parallels through Tanjong Noejew (*Lat.* 0° 53' S., *Long.* 131° 14' E.) and the northern extremity of Nanah, an islet about one mile south-south-westward of Doom, and the meridian through the western extremity of Doom.

Ram, an island, lying about a mile south-westward of Tanjong Sorong, is covered with high trees on its western side; on the eastern side there are some trees of a peculiar shape. On the reef, which dries, extending from the northern side of the island are three islets covered with growth, and a reef, on which there are some low black rocks, extends about 1½ miles westward of the islands.

Tsiof is a wooded island, situated about 2½ miles southward of Ram. Close off its south-western side are some rocks above water, and off its

Chart 1416.

northern side, the shore reef extends 4 cables, with three detached reefs, marked by discoloration outside it.

An unofficial beacon marks the southern edge of a detached reef, 4 cables south-south-westward of Nanah.

A light is exhibited, at an elevation of 7 feet (2^m1), from the head of the pier on the eastern side of Doom.

A shoal, with a depth of 26 feet (7^m9), lies about $2\frac{1}{2}$ cables eastward of the light structure.

Anchorage.—Directions.—Anchorage may be obtained in Reede Sorong, in depths of from 11 to 14 fathoms (20^m1 to 25^m6), where there is a good navigable channel, though it is open southward, south-eastward of Doom. In the event of strong southerly winds a vessel may shift to the northern side of the island. If remaining for some time, a vessel should moor on account of the strong tidal streams.

A vessel approaching Reede Sorong from northward should pass westward of the black rocks lying westward of Ram, and thence steer for the conspicuous islet lying on the outer edge of the coastal reef about $1\frac{1}{2}$ cables westward of Tanjong Noejew. After passing between this islet and the northern side of Doom, where the tidal stream frequently sets eastward or westward, Sorong village will be sighted.

Charts 1416, 3744.

Southern entrance to Straat Sélé and approaches.—Dangers.

—Anchorages.—A 3-fathom (5^m5) patch lies about $6\frac{1}{2}$ miles south-westward of Tanjong Sélé, and a shoal, with a least depth of 23 feet (7^m0), lies about 3 miles farther south-westward. A bank, parts of which dry, extends about 4 miles south-south-eastward from Tanjong Sélé. For dangers farther eastward, see page 211. In the western approach, southward and south-eastward of Gebroken eilanden, there are three patches with depths of from 16 to 18 feet (4^m9 to 5^m5) within a distance of 5 miles of that group.

Membok, a low islet, lies on the western side of the entrance, about $1\frac{1}{2}$ miles north-westward of Tanjong Sélé, and shoals, with depths of from 13 to 18 feet (4^m0 to 5^m5), lie within one mile south-westward of the islet.

Good anchorage may be obtained, in depths of from about 6 to 9 fathoms (11^m0 to 16^m5), hard bottom, during the West monsoon, eastward of Peli, an islet situated on the western side of the entrance, about $1\frac{1}{2}$ miles north-north-eastward of Membok; also eastward of Loego (Lugo), an islet about half a mile westward of Seget village, during the East monsoon, in a depth of about 14 fathoms (25^m6), mud and sand.

Directions.—A vessel approaching the southern entrance to Straat Sélé should keep the western extremities of Membok and Peli in line, bearing about 011° until the southern side of Tanjong Sélé (*Lat. $0^\circ 26'$ S., Long. $130^\circ 56'$ E.*) bears 090° , thence she should keep in mid-channel through the narrows.

Chart 1416.

After passing Tanjong Waifkalettet, on the eastern side of the northern end of the narrows, a vessel should steer to pass eastward of Jef (Yef) Nanas, about $2\frac{3}{4}$ miles north-eastward, thence eastward of Saloetoen (Salutun) Genan, which has higher trees on it than the adjacent islands, taking care to avoid the small reef, which dries, about half a mile eastward of it; thence eastward of Segarau, from the

Chart 1416.

northern side of which a reef, which dries, marked by a beacon at its extremity, extends about $1\frac{1}{2}$ cables northward. Thence she should keep the eastern extremities of Segarau and Saloetoen Genan in line astern, bearing 196° , until Mehil, an islet situated about $4\frac{1}{2}$ miles north-eastward of Segarau, bears 101° , when she should steer about 057° , which leads between the islands Balbili and Kabra Bemoeck. When the eastern extremity of Balbili is in line with the eastern extremity of Wolo, about $2\frac{1}{2}$ miles southward (which island can be identified by a high, round-topped tree), bearing 182° , the vessel should alter course northward and keep this alignment on astern, which leads clear of all dangers, passing eastward of an unofficial beacon marking the northern end of a reef, which dries, about one mile north-eastward of the northern end of Kabra; thence she should pass out of the northern end of the strait between Rombombo eilanden and Tsióf.

If bound for Reede Sorong, the vessel should continue with the eastern extremities of Balbili and Wolo in line astern, bearing 182° , until Nanah bears 045° , when she may alter course to pass either northward or southward of that island. If passing southward she should pass between an unofficial beacon, which marks the southern edge of a detached reef, which dries, about 4 cables south-south-westward of the southern extremity of Nanah, and an unofficial beacon, which marks a 13-foot (4^m0) patch, about $2\frac{1}{2}$ cables farther in the same direction. A rock, which dries, and is marked by an unofficial beacon, lies about 8 cables south-south-eastward of the same point.

A vessel with local knowledge can pass between Nanah and Tsióf and thence between Doom and Tanjong Noejew into Reede Sorong.

There are several other routes which vessels can take through Straat Sélé. Instead of passing between Balbili and Kabra Bemoeck, a vessel can proceed through Sangoilin Mon or Heilige straat, between Kabra and Warir, by keeping in mid-channel, and when well past the eastern point of Batimee, on the south-eastern side of Warir, she should keep this point in line astern with the northern of the Sobrain eilandjes, bearing about 198° , which leads westward of the 5-foot (1^m5) reef, situated westward of the northern part of Kabra; when the northern extremity of Kabra bears 090° , she should steer north-eastward and pass south-eastward of two shoals, with depths of 16 and 11 feet (4^m9 and 3^m4), situated about 2 miles south-eastward of Matan. When the eastern extremities of Balbili and Wolo are in line, bearing 182° , she should alter course northward and proceed as previously directed with these marks in line astern.

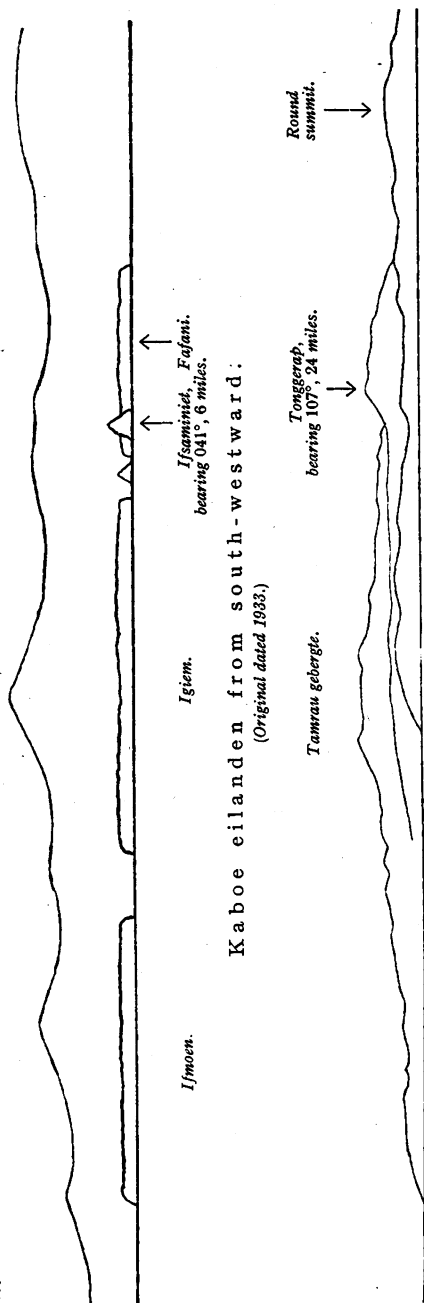
The route southward of Balbili may also be taken.

Vessels with local knowledge may take the route along the Salawati coast, passing westward of Jef (Yef) Mo (*Lat. $1^\circ 13' S.$, Long. $131^\circ 03' E.$*), and thence northward through Straat Lenna, between Salawati and Warir. The northern part is, however, difficult to navigate when the reefs are not easily seen.

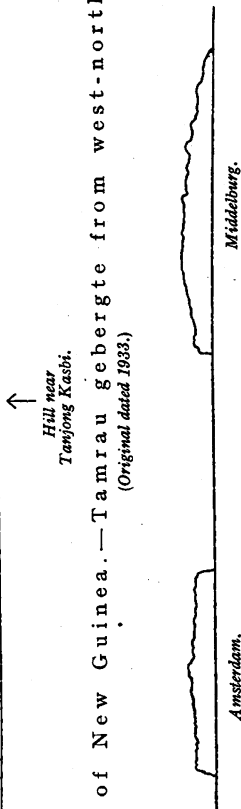
Chart 3745.

NORTHERN SIDE OF NEW GUINEA.—Coast.—Between Tanjong Sorong (page 206) and Kaap de Goede Hoop (Cape of Good Hope) (chart 942b), 79 miles east-north-eastward, the coast is mostly high. Between Tanjong Sorong and Tanjong Doré (Dorei), about 20 miles east-north-eastward, there are no conspicuous features, but

Charts 3242, 942b, 2759a, 1263.



North coast of New Guinea.—Tamrau gebergte from west-north-westward.
(Original dated 1933.)



North coast of New Guinea.—Mios Soe from south-south-eastward.
(Original dated 1933.)

Chart 3745.

the western spurs from the Tamrau gebergte, of which, Tonggerap or Groote Olifant, 3,865 feet (1178^m0) high, about 32 miles eastward of Tanjong Doré, is the most conspicuous, will usually be in sight. See view facing this page. 5

Batu Lobang, 76 feet (23^m2) high, lies close offshore, about 12 miles east-north-eastward of Tanjong Sorong. About 1½ miles south-westward of this rock is the mouth of the War Samson (Wasamson), off which a vessel may obtain temporary anchorage, in a depth of about 25 fathoms (45^m7), about 3½ cables offshore. The river can be entered by a steamboat, but one mile within the mouth the current is too rapid for further navigation. 10

The following mountains lie near the coast:—Morait, 1,424 feet (434^m0) high, about 2½ miles south-westward of Tanjong Doré; Olifant, 1,539 feet (469^m1) high, about 20 miles eastward of Tanjong Doré and nearly 2 miles inland; a mountain with a round summit, 1,674 feet (510^m3) high, about 2½ miles eastward of Tanjong Sawasar, situated about 23 miles east-north-eastward of Tanjong Doré; and an equally round-topped hill about one mile within Tanjong Kasbi, about 6 miles north-eastward of Tanjong Sawasar. 20

Behind this coastal hilly land, and separated from it by the valley of the War Samson, which runs east and west, is a high ridge of mountains which extends eastward to join the massive Tamrau gebergte, the summits of which are nearly always enveloped in clouds. 25

Chart 1416, plan of Dorei Hum bay.

Doré Hoem baai.—Doré Hoem baai (Dorei Hum bay), entered between Tanjong Doré and a point about 2½ miles south-eastward, affords anchorage, in a depth of about 15 fathoms (27^m4), sheltered from the northerly swell, southward of Makebon village, situated about one mile southward of Tanjong Doré. Foul ground extends 1½ miles eastward from Tanjong Doré. Hoem (Hum), on the eastern side of the entrance, is a low islet with high trees on it, from which foul ground extends about 1½ miles north-north-eastward and about one mile westward. There are several detached shoals in the bay, the positions of which may best be seen on the chart. 35

Saoesoet village is situated on the creek of the same name about 1½ miles south-eastward of Hoem, and Bawé and Mabi villages stand on the southern shore of the bay.

Chart 3745.

Coast.—Tanjong Asi, about 10 miles eastward of Tanjong Doré, can be identified by a mountain, 1,802 feet (549^m2) high, which lies close within it and slopes steeply to the sea. Asbakin village stands at the mouth of a creek about 1½ miles westward of Tanjong Asi. 40

About 12½ miles eastward of Tanjong Asi (*Lat.* 0° 44' S., *Long.* 131° 42' E.) is Reede Mega, situated off Mega (Maga) village, which stands on the western side of the mouth of Sungei Mega, the valley of which is a conspicuous break in the otherwise continuous line of coastal hills; it becomes steep again at Tanjong Sawasar, about 1½ miles northward. 45

A bank, with depths of from 3½ to 5 fathoms (5^m9 to 9^m1), sand and mud, extends about 1½ miles offshore at Mega and the coast westward of it. On the outer edge of the bank are some drying patches, which partially shelter the roadstead, and about a quarter of a mile outside the westernmost patch there is a dark-coloured rock above water, 50

Chart 3745.

which is conspicuous. A $2\frac{1}{2}$ -fathom (4^m6) patch lies about $2\frac{1}{2}$ miles westward of Tanjong Sawasar.

Charts 3745, 942b.

- 5 Between Tanjong Sawasar and Tanjong Sansapor, 16 miles north-eastward, the coast is fairly steep-to, and anchorage may be obtained in favourable weather almost anywhere, in depths of from $6\frac{1}{2}$ to 8 fathoms (11^m9 to 14^m6).

- A shoal, with a depth of 8 feet (2^m4), lies nearly $2\frac{1}{2}$ miles northward of Tanjong Kasbi, 6 miles north-eastward of Tanjong Sawasar.

Chart 942b.

Between Tanjong Sansapor and Kaap de Goede Hoop, about 21 miles east-north-eastward, the coast is high, steep spurs sloping down from Tamrau gebergte.

- 15 Mios Soe (Mios Su) consist of two low coral islands, Amsterdam and Middelburg, covered with high trees, and each fringed by a reef, lying $2\frac{1}{2}$ miles offshore, about $8\frac{1}{2}$ miles north-eastward of Tanjong Sansapor (*see view facing page 209*). The passage between Middelburg and the coast is clear of dangers except for a $3\frac{1}{2}$ -fathom (6^m4) patch lying about 20 $1\frac{1}{2}$ miles eastward of the southern part of Middelburg. There is a boat pier on the southern side of Middelburg; there are coconut plantations on both islands.

Approaching from westward by night, these islands are not difficult to distinguish, provided a vessel does not keep too far to seaward.

- 25 Coming from eastward they are plainly visible, as they are then seen clear of the high coast of the mainland.

- Between Tanjong Opmarai, $11\frac{1}{2}$ miles north-eastward of Tanjong Sansapor, and Kaap de Goede Hoop, the coast is fringed by a bank, with depths of from about 5 to 10 fathoms (9^m1 to 18^m3), over which anchorage may be obtained during the South-east monsoon; in the North-west monsoon there are heavy rollers on it. About $4\frac{1}{2}$ miles eastward of Tanjong Opmarai is the mouth of Sungei Kor, on the eastern side of which there is a good landing place when there is an easterly swell. Landing can also be effected during an easterly swell under the lee of some coastal rocks, near some dwellings eastward of the entrance. There is a rock covered with vegetation close off these dwellings. This river can be entered by a steamboat at high water, but is only navigable for about three-quarters of a mile above its mouth.

- 40 Kaap de Goede Hoop or Tanjong Jamoersba (*Lat. $0^\circ 20' S.$, Long. $132^\circ 24' E.$*), the northern extremity of New Guinea, is steep-to, and can be identified by some yellow stripes on it, and when approaching it, a small lower cape will be seen projecting at right angles from it, *See views facing page 215.*

- 45 For coast eastward, *see Pacific Islands Pilot, Vol. I.*

Chart 3744.

- WESTERN SIDE OF NEW GUINEA.—Coast.**—The coast between Tanjong Sélé (page 206) and Tanjong Sabra (chart 3743), about 96 miles south-eastward, is generally low and densely wooded, and consequently there are few landmarks. There is, however, some higher land at Tanjong Jamtoep (Yamtup), 31 miles eastward of Tanjong Sélé, which can be distinguished from off Jef Joes (page 211). Extensive mudbanks, which dry in places, extend a considerable

Charts 3242, 942b, 2759a, 1263.

Chart 3744.

distance offshore, and coral and sand patches, which dry, lie on and near the edge of the coastal mud flat.

The coast between Tanjong Sélé and Tanjong Wamonket, about 18 miles east-south-eastward, is covered with high trees; the former point is conspicuous from southward and the latter from westward. Oempe (Umpe) is an islet lying about one mile south-south-westward of Tanjong Kaledoko, situated about 4 miles east-south-eastward of Tanjong Sélé. Joes (Yus) Genan, an islet fringed by a reef, lies about 2 miles west-north-westward of Tanjong Wamonket, and one mile offshore, with a depth of 8 feet (2^m4) between it and the coast. 5 10

Off-lying islet and dangers.—A rock, with a depth of less than 6 feet (1^m8), lies about $4\frac{1}{2}$ miles south-eastward of Tanjong Kaledoko and 3 miles offshore. A shoal, with a depth of 11 feet (3^m4), lies 5 miles south-westward of Joes Genan, with other shoals between them. Jef Joes (Yef Yus), a low islet with high trees, lies about 14 miles south-south-westward of Tanjong Wamonket; it is fringed by a reef, which is not marked by discoloration. A shoal, with a least depth of 23 feet (7^m0), lies about 8 miles west-south-westward of Jef Joes. Shoals, with depths of 26 and 29 feet (7^m9 and 8^m8), lie about 12 and $14\frac{1}{2}$ miles north-westward of Jef Joes. A patch, which dries, lies about 6 miles south-south-eastward of Tanjong Wamonket. 15 20

Caution.—Caution is necessary when approaching the mouths of the rivers between Tanjong Sélé and Tanjong Sabra, as the channels are liable to change. The following remarks concerning the rivers on this coast were compiled in 1911. 25

Coast.—Segoen baai, entered between Tanjong Wamonket and Tanjong Jamtoep, is encumbered with shoals, and its shores are fringed with wide banks which dry. Four rivers flow into the bay. A 30 channel, with a least depth of 19 feet (5^m8), leads southward from the bay between banks which dry, but it can only be reached over a bank with a least depth of 6 feet (1^m8).

Segoen rivier flows into the western side of Segoen baai. It was ascended in 1911 for a distance of about 8 miles, and anchorage was obtained off the Wasop, a tributary which flows into the western bank. The river was deep as far as this point, but a short distance farther there was a rock which was difficult to pass, 3 miles above which the river was about three-quarters of a cable wide. The banks, except in a few places, were low and covered with vegetation. The stinging gnats are very troublesome. 35 40

Beraoer rivier is entered between Tanjong Jamtoep and Sille Sebak. Extensive banks, which dry, extend from the western side of the mouth of the Beraoer and from the coast between the mouths of these rivers. A bank, which dries, in the entrance, divides it into two channels, in the western of which there is a least depth of 5 feet (1^m5), and in the eastern, 8 feet (2^m4). In the approach, there are depths of from 6 to 8 feet (1^m8 to 2^m4) over the coastal bank. Jef (Yef) Matel, a low islet, lies close within the south-eastern extremity of the bank which extends south-eastward from Tanjong Jamtoep (*Lat.* $1^{\circ} 31' S.$, *Long.* $131^{\circ} 50' E.$). 45 50

The river has been ascended for a distance of about 25 miles to a point where it is formed by the confluence of the rivers Merarin and Giliwolo; there it is about a quarter of a cable wide, with a depth of about

Charts 3242, 942b, 2759a, 1263.

Chart 3744.

7 fathoms (12^m8). The Merarin flows from northward, and by following it, mountainous country would probably be reached in a short distance. The Giliwolo appears to run in an easterly and westerly direction. Karabra rivier was reached through the Silile Djamka and Fagoe rivier.

Off-lying islet and dangers.—Jef Jal (Yef Yal), about 9 miles southward of Tanjong Jamtoep, is low and fringed by a reef, which is not marked by discoloration. There are several reefs in the vicinity, and many shoals, with depths of from 6 to 18 feet (1^m8 to 5^m5), which are seldom marked by discoloration, lie from about 14 to 27 miles south-eastward of Jef Jal, the positions of which may best be seen on the chart.

Coast.—Karabra rivier has two mouths, the eastern and principal of which is shallow; the western, named Silile Sebak, is about 8 cables wide near its mouth, and maintains a width of more than a quarter of a mile to its junction with the Samesan, about 4 miles from the entrance, above which it narrows. A conspicuous high tree stands on the western entrance point of the Karabra. A bank, which dries, lies about 3 miles south-westward of this point.

The Silile Sebak is only accessible for small craft, as there are depths of from only 3 to 9 feet (0^m9 to 2^m7) on the coastal bank.

The Karabra has a width of over 2 cables where the Silile Sebak branches off, but about 4 miles higher up, where the Fagoe rivier enters through the right bank, it becomes narrower, and the depths, which have been from 4 to 7 fathoms (7^m3 to 12^m8), are more irregular. The lower reaches are easily navigable; above the mouth of the Kelakais, a tributary on the left bank, about 6 miles above the Fagoe, the left bank should be avoided, on account of rocks on that side. The banks are low at first, and close along the river are sago trees. About 4 miles above the Kelakais, the river flows through a range of limestone hills, trending east and west, and about 300 feet (91^m4) high, which rise abruptly from the muddy land. The width of the river below the hills is about half a cable, but is less than half that width between the vertical banks. The current here is strong.

Seremoek rivier is entered between Tanjong Kakmela, about 17 miles east-south-eastward of Tanjong Jamtoep, and Tanjong Seleboi, about 5 miles farther. A bank, which dries, extends about 1½ miles from Tanjong Kakmela.

Kaiboës baai, into which Kaiboës rivier and Maoewan rivier flow, is entered between Tanjong Seleboi and Tanjong Bakoi, 5½ miles south-eastward. It is encumbered in its entrance by an extensive bank, which dries, on the western side of which there is a channel, with depths of from 8 to 11 feet (2^m4 to 3^m4), leading to the Maoewan rivier, and on the eastern side a channel, with depths of from 2½ to 5 fathoms (5^m0 to 9^m1), leading to the Kaiboës rivier. The least depth, in 1938, on the outer bank just outside the latter channel, was about 7 feet (2^m1). On this bank high and low water occur from one to 1½ hours earlier than in the mouth.

A vessel approaching from westward after passing Jef Jal should steer for Tanjong Sibaboe (*Lat.* 1° 44' S., *Long.* 131° 54' E.), about 3½ miles south-south-eastward of Tanjong Bakoi, bearing 091°, until the eastern rounded bank of Kaiboës rivier bears about 041°, when she should steer 059°, which leads across the bar just outside the eastern

Chart 3744.

channel. Beacons are placed by the natives along the edges of the banks on each side of the channel, but they must be given a good berth. A vessel with local knowledge can safely proceed up the river until just westward of the large tributary near Ben, an island 5 miles above Konda village. This village is the headquarters of a Government official.

Warongé rivier is entered between Tanjong Sibaboe and Tanjong Roemoninpori (Rumoninpori), about $5\frac{1}{2}$ miles southward. A wide bank extends from the coast here, and a shoal, which dries, lies about 4 miles westward of Tanjong Roemoninpori. The channel into the river leads between this point and the shoal, in a least depth of $3\frac{1}{2}$ fathoms (5^m9), and thence north-eastward along the southern bank. The river was ascended, in 1911, for a distance of about 30 miles; the depths were found to be very irregular, but not less than 11 feet (3^m4) in any part. A short distance above the farthest point reached, the river divided into several small branches.

Animenroe rivier flows out between Kaiboes rivier and Warongé rivier.

Chart 3743.

Three rivers, Metamani, Davoer, and Kais flow out between Tanjong Roer (Rur), situated 15 miles south-south-eastward of Tanjong Roemoninpori, and Tanjong Oeaim (Uaim), about $2\frac{3}{4}$ miles southward. The river mouths can only be reached by small craft, with a draught of from 5 to 6 feet (1^m5 to 1^m8) at low water. A bank, with depths of from 6 to 11 feet (1^m8 to 3^m4), extends about 4 miles from the mouth. A vessel with local knowledge can reach the mouth of the Metamani, which is the principal river of the delta, in a least depth of 10 feet. In the delta between the sand and mud flats there are depths of from 10 to 30 feet (3^m0 to 9^m1). The Kais is from $1\frac{1}{2}$ to nearly 4 cables wide and has depths of from $2\frac{1}{2}$ to $7\frac{1}{2}$ fathoms (4^m6 to 13^m7) between its marshy banks. Jahadiang village is situated about 6 miles from the mouth.

There is a wide, deep entrance to Metamani rivier, southward of the sand flats off the mouths of the other two rivers. The lower part of the river runs in a north-easterly direction through an extensive marshy district, and is nearly $1\frac{1}{2}$ cables wide, with depths of 5 fathoms (9^m1). About 7 miles above Tanjong Oeaim the river makes a sharp bend south-eastward near Moegem village. The Metamani was explored for a distance of 16 miles, and depths of 6 fathoms (11^m0) were found up to that point, when the water still remained salt; the width of the river, however, was much reduced. The banks are everywhere low and covered with mangroves.

Approaching Metamani bay from westward Tanjong Winsop, situated $5\frac{1}{2}$ miles north-westward of Tanjong Roer, and Tanjong Oeaim are first sighted; the first-named point has a few scattered trees on it; thence to Tanjong Oeaim the coast is low, and on this point there are some high trees. Tanjong Roer is not seen until later, when it has the appearance of a steep headland with trees on it.

Sigaroi rivier is entered about 11 miles south-eastward of Tanjong Oeaim (Lat. $2^{\circ} 05' S.$, Long. $132^{\circ} 01' E.$). A mud and sand bank, with depths of from 3 to 8 feet (0^m9 to 2^m4), lies off the entrance. In 1911, there was a least depth of 10 feet (3^m0) in the entrance channel. Higher up, the river has depths of from $2\frac{1}{2}$ to $5\frac{1}{2}$ fathoms (5^m0 to 10^m1),

Chart 3743.

and is about one cable wide. There are several tributaries, on the banks of which there are numerous dwellings on piles.

Tanjong Sabra lies about 23 miles south-eastward of Tanjong Oeaim.

- 5 **MC CLUER GULF.**—This gulf, so named after Lieutenant Mc Cluer, who sailed up it in 1791, is known to the natives as Telok Berau. It is about 25 miles wide at its entrance between Tanjong Sabra and Tanjong Salakiti, narrowing to about 13 miles at the entrance to Golf van Bintoeni, which is the name given to the eastern end, and which
10 continues eastward to within 16 miles of Geelvink baai, on the northern coast of New Guinea.

The shores are sparsely populated. Kokas village, in Baai van Sekar, on the southern side of the gulf, about 18 miles eastward of Tanjong Salakiti, is the principal trading place.

- 15 The depths are irregular, but except for some shoals in the approach to the large bight on the southern side, eastward of Baai van Sekar there are no dangers in the fairway.

- The southern shore is moderately high and rocky as far eastward as Tanjong Goras, about 17 miles east-south-eastward of Tanjong Sekar,
20 the western entrance point of Baai van Sekar, elsewhere it is low and bordered by mangroves. The wide tongue of land which terminates in Tanjong Fatagar, 13 miles south-westward of Tanjong Salakiti, attains an elevation of 3,518 feet (1072^m3), about 17 miles within the point, and is densely wooded, but has no conspicuous peaks. Else-
25 where the mountains are so far inland on both sides of the gulf that they are of no use for navigation. Pisang eilanden (page 222) are an excellent mark for making the gulf.

- Tidal streams.**—The tidal streams set regularly in and out of the gulf, setting in until the time of high water and out until the time of
30 low water. The maximum rate, which was observed to be 2½ knots, occurs in the deep channels between the banks near the southern shore eastward of Baai van Sekar. On the northern side, where the influence of several large rivers is felt at low water, the streams are very variable both in their direction and rate. In the rainy season the rivers dis-
35 charge much discoloured water, which is sharply defined against the sea water for a considerable distance offshore.

Climate.—The climate over the whole of Mc Cluer gulf is very agreeable. In the northerly monsoon, squalls combined with strong tidal streams make conditions difficult for small craft.

- 40 **Northern shore of Mc Cluer gulf.**—The northern shore is bordered by extensive low marshy land, within which the mountain ranges begin. Tanjong Sabra is conspicuous from north-westward on account of its high casuarina trees, with a sandy beach in front of them, in place of the usual mangroves in the water by which these low coasts
45 are almost always bordered, but if approaching it from between west and south, it is difficult to distinguish the clump of trees on the point from others north-westward and eastward of it. On closing the point, however, the sandy beach and the narrow coastal reef, which dries, eastward of the point will be seen.

- 50 The navigation along the northern shore is not difficult, but it should not be approached closely anywhere; the banks of the mouths of the rivers are very steep-to. A large casuarina wood near Tarof village, about 9 miles north-eastward of Tanjong Sabra (*Lat.* 2° 27' S., *Long.*



Kaap de Goede Hoop,
bearing 081°, 24 miles.

North coast of New Guinea.—Kaap de Goede Hoop from westward.
(Original dated 1933.)



Kaap de Goede Hoop,
bearing 254°, 20 miles.

North-coast of New Guinea.—Kaap de Goede Hoop from east-north-eastward.
(Original dated 1933.)



S. entrance point W. entrance point
of Patipi baai, of Salakitti baai
bearing 093°, 12 miles.

Southern side of McCluer gulf from northward of Tanjong Fatagar.
(Original dated 1933.)

Chart 3743.

132° 17' E.), is conspicuous. There is also a small clump of trees in the shallow bight between Tarof and the mouth of Kemoedan rivier, 12½ miles east-south-eastward.

Kemoedan rivier is fronted by a bar with a depth of 3 feet (0^m9), 5 but there are considerable depths within it, and it is about a cable wide for the first few miles. This river, which is named Aifat in its upper reaches, is navigable by large praus as far as Monggé village, about 30 miles from its mouth, and by small craft to Samaniak, 12 miles farther up; above this there are rapids. The stream in the lower 10 reaches at normal water level attains a rate of 2 knots.

Sebjar rivier, which flows out about 17 miles eastward of Kemoedan rivier, is fronted by a bar with a depth of about 6 feet (1^m8), but deepens inside, and has a width of about one cable for the first few miles. A small vessel with local knowledge can proceed about 30 miles up the 15 river. The banks are to a great extent covered at high water. The water is fresh close to the mouth. There are a number of villages on the banks of the river.

Charts 3743, 3742.

Southern shore of Mc Cluer gulf.—Dangers.—A reef, with a least 20 depth of 13 feet (4^m0), and not marked by discoloration, extends about 1½ miles westward from Tanjong Fatagar. There are strong tide-rips off this point and they extend a considerable distance westward from it. See view facing this page.

About 2½ miles north-eastward of Tanjong Fatagar is Was, an islet, 25 286 feet (87^m2) high, lying close offshore with foul ground between. A rock, which dries, lies about half a mile offshore, about one mile south-westward of Was.

Chart 3743, plan of Patipi, Salakiti bay and Telok Tawar.

About 2 miles east-north-eastward of Was is Sagemoer, an islet 30 lying on the narrow coastal reef, and which is difficult to identify. A 2½-fathom (4^m6) patch lies close northward of the islet.

Telok Tawar, entered about 2 miles eastward of Sagemoer, affords shelter to small vessels during the South-east monsoon but it is not safe in the North-west monsoon. Roembati (Rumbati) village is situated 35 behind a rocky point about 4 cables westward of the western entrance point; the houses stand on piles in the water, and only the mosque is on the land; the village is not visible to a vessel approaching from westward.

Salakiti baai, entered about 1½ miles east-north-eastward of Telok 40 Tawar, is sheltered by several islets and rocks lying north-westward of its north-eastern entrance point, which ensure a smooth anchorage inside. In the south-eastern part of the bay there are some small islets on the shore bank which extends about half a mile off. Patipi village, the houses of which stand on posts in a basin which dries, is 45 situated close north-eastward of the north-eastern entrance point of the bay, but it is not visible from seaward.

Patipi baai or Solat Len is entered between Tanjong Kramram (Lat. 2° 43' S., Long. 132° 04' E.), about three-quarters of a mile north-eastward of the north-eastern entrance point of Salakiti baai, and Tanjong 50 Osir, about 1½ miles farther north-eastward. The bay is clear of dangers in the fairway. About three-quarters of a mile from the head of the bay is Boenoha (Bunoha), a small group of rocks above water, lying about 2 cables westward of the edge of a steep-to mudbank,

Chart 3743, plan of Patipi, Salakiti bay and Telok Tawar.

northward of which there is a boat channel leading to the mouth of the Degen rivier. There are a few scattered groups of houses along the shores of the bay.

- 5 Anchorage may be obtained, in depths of from 6 to 10 fathoms (11^m0 to 18^m3) in Patipi baai. The tidal streams off the entrance to the bay sometimes cause strong whirlpools.

Chart 3743.

- The coast between the entrance to Patipi baai and Tanjong Sekar, 10 about 20 miles eastward, is rocky, and rises to an elevation of 2,346 feet (715^m0) about 2 miles inland from the tongue of land forming the northern side of Patipi baai.

Chart 3743, plan of Sekar bay and approaches.

- Baai van Sekar and approaches.—Dangers.**—This bay entered 15 between Tanjong Sekar and Tanjong Taramnoesa, about 2½ miles eastward, is afforded protection from the wind and sea by the islands fronting it. Of these, Ogar, 742 feet (226^m2) high, is the largest of a group, which are all steep and thickly covered with vegetation; of the others, the principal are West eiland, 305 feet (93^m0) high, lying 20 3¼ miles west-north-westward of the northern extremity of Ogar, and Argoeni, 437 feet (133^m2) high, about 1½ miles eastward of Ogar. The only signs of habitation are on the largest of the Sariga eilanden, between Ogar and West eiland, at Sekaoe, on the southern side of Ogar, and at Argoeni village, on the southern side of the island of that name. 25 See views facing page 217.

- Two reefs, with depths of 3 feet (0^m9) and 16 feet (4^m9), lie 2½ miles and one mile, respectively, west-north-westward of West eiland; neither of these reefs is marked by discoloration. Krok, a rock covered with vegetation, lies about a quarter of a mile south-westward 30 of the southern extremity of Ogar. A group of islets, of which Dwars in den weg is the north-westernmost, lie between the south-eastern side of Ogar and the mainland.

- Reede Kokas.—Light.**—The limits of this roadstead are an imaginary line drawn in an 090° direction from the extremity of the 35 point eastward of Kokas, situated on the southern side of the western part of Baai van Sekar, and the arc of an imaginary circle with a radius of 4,101 feet (1250^m0) and the pier head as centre.

- A sandbank, with depths of from 1½ to 3 fathoms (3^m2 to 5^m5), lies in the entrance to Reede Kokas, but the depths over it are liable to 40 change when Sungei Kaioeni (Kaiuni), which flows into the head of the bay, is in spate.

A light (*Lat.* 2° 42' S., *Long.* 132° 25' E.) is exhibited, at an elevation of 20 feet (6^m1), from a mast on the pier-head at Kokas.

- Anchorage may be obtained, in a depth of about 3½ fathoms (6^m9), 45 about a cable northward of the pier-head at Kokas. There is a depth of 5 feet (1^m5) at the head of the pier.

- Kokas village, standing on the slope of a hill, is the headquarters of a Government official, whose residence is marked by a flagstaff on the plan. Provisions are scarce. There is a conspicuous mosque in Sekar 50 village, about 1½ miles south-eastward of the pier at Kokas.

Tidal streams.—The tidal stream which sets into the western part of Mc Cluer gulf, divides into two branches in the vicinity of West eiland, one setting towards the channel southward of Ogar and Argoeni, the other passing northward of these islands, sets eastward through the

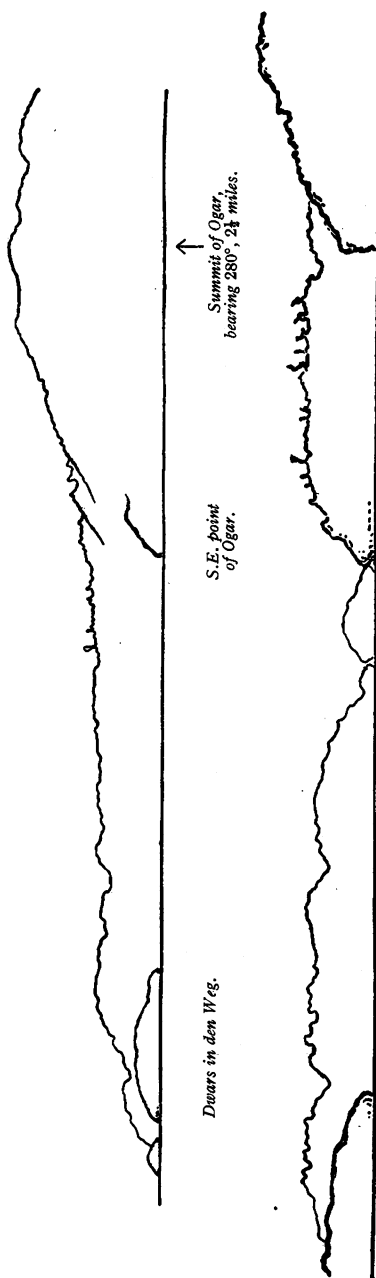
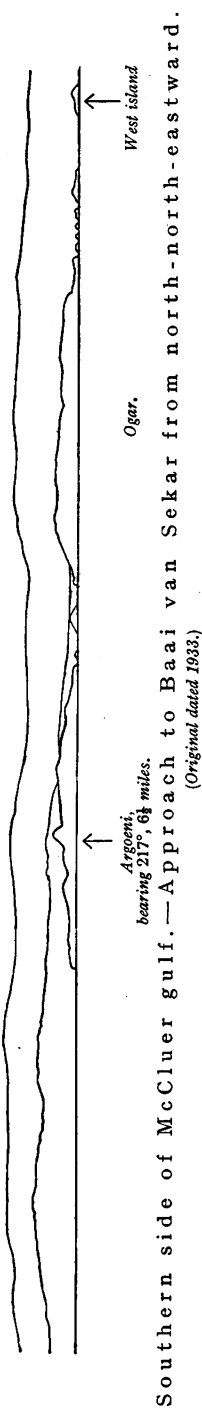
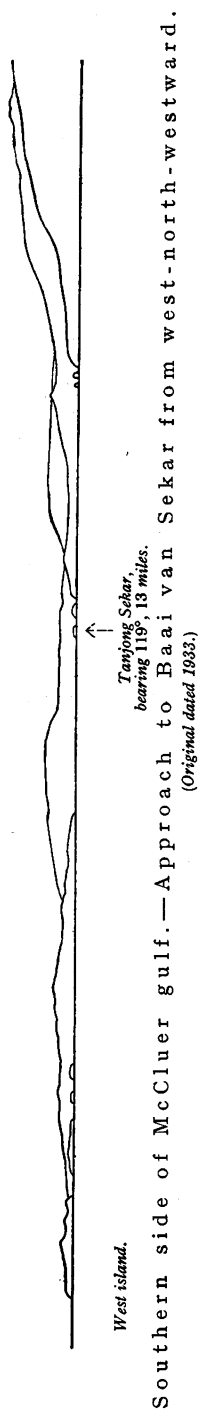


Chart 3743, plan of Sekar bay and approaches.

channels between the banks in the large bight eastward of these islands. In the narrowest parts the rate is as much as 3 knots. There are strong tide-rips off West eiland.

Directions.—A vessel approaching Baai van Sekar from eastward should pass well eastward of Argoeni to avoid the shoal extending one mile east-south-eastward from it; the summit of this island can be easily identified, and when the summit of Ogar bears 280° she should steer for it on that bearing (*see view facing this page*), and when $2\frac{1}{2}$ miles from it should steer for Dwars in den weg, but the southern side of Ogar can be approached closely if necessary; thence pass between Dwars in den weg and Ogar, and thence into Baai van Sekar by passing close eastward of Tanjong Sekar, with the pier at Kokas bearing 182° , or the residence of the Government official, 185° , which will lead to the anchorage in Reede Kokas.

Small vessels approaching from north-eastward may pass between the western extremity of Argoeni and a small rock, covered with vegetation, which lies at the northern end of a reef with a depth of 10 feet (3^m0), situated about $3\frac{1}{2}$ cables west-south-westward, and thence proceed as directed above for a vessel from eastward. Or, a vessel may pass between the largest islet lying midway between Argoeni and Ogar, and the latter island, by steering for the south-eastern point of Ogar, bearing 240° . (*See view facing this page*). As the tidal stream at its strength is irregular in this vicinity, care should be taken to keep this point in the middle of the opening between the largest islet and those north-westward of it. After passing between these islets the vessel should alter course southward and proceed as directed above.

Chart 3743.

Coast.—The coast eastward of Baai van Sekar consists of limestone cliffs, thickly covered by vegetation, and rising steeply from the sea. In places there are white chalk patches on the cliffs. In these cliffs there are numerous caves, in which the natives conceal the bones of their dead beneath weapons and household articles, with sacred images to guard them. Blood-red imprints of hands are found on the bare white cliffs in the vicinity of the bones, which are attributed to evil spirits, and sometimes appear at apparently inaccessible spots.

Numerous bare peaks, in the form of sugar-loaves, give a peculiar character to the mountainous land with trees, devoid of leaves, standing on top, like stubble. The mountains, which run parallel to the coast about $2\frac{1}{2}$ miles inland, attain an elevation of 1,530 feet (466^m3), about 5 miles southward of the eastern extremity of Argoeni, but this summit is not conspicuous. Behind this coastal range there is a wide valley, inland of which the central range of the peninsula attains an elevation of 4,754 feet (1449^m0), but also without any conspicuous peaks.

Rocky islets, covered with vegetation, lie close off this coast. Goras, close westward of Tanjong Goras, about 14 miles south-eastward of Tanjong Taramnoesa (*Lat. $2^{\circ} 41' S.$, Long. $132^{\circ} 27' E.$*), is the principal village. Batu Lajar, rising from the sea like an obelisk, lies close off Darembang village, about $3\frac{1}{2}$ miles north-westward of Goras; it is very conspicuous from north-westward and bears a resemblance to a prau under sail.

Between Tanjong Goras and Tanjong Tanah Merah, about 33 miles north-eastward, a wide mudbank extends offshore, and there are many detached shoals, with depths of less than 5 fathoms (9^m1), lying within

Chart 3743.

as much as 12 miles of the coast at the western end, the positions of which may best be seen on the chart.

Near Tanjong Goras, the mountains recede inland, leaving a monotonous coast of mangroves. Through this marshy land flow several creeks, the principal of which are Sungei Bedidi and Sungei Bomberai, 5 and 6 miles, respectively, eastward of Tanjong Goras. Each of their entrances is nearly closed by a bar which dries, but they are accessible to small craft with local knowledge. Sungei Bedidi is about $1\frac{1}{2}$ cables wide at its entrance, but narrows to about 65 yards (56^m4) at its junction with the Toewona, a tributary on the left bank, on which the fairly large settlement of Sirem stands.

GOLF VAN BINTOENI.—The entrance to this gulf lies between Tanjong Tanah Merah and Tanjong Mingari, $13\frac{1}{2}$ miles north-westward. Both sides are fringed by low marshy land, except for two hills on Tanjong Tanah Merah, which are 227 and 257 feet (69^m2 and 78^m3) high, respectively, are bare on the seaward side and consist of reddish loam.

The northern shore has few inhabitants but the southern shore is fairly well populated.

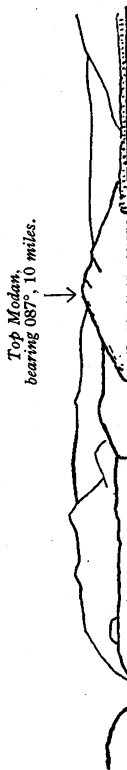
There are some mountains around the head of the gulf which are fairly conspicuous. The principal of these from north to south are :—Steenkoolberg, about 1,640 feet (499^m9) high, about 35 miles east-north-eastward of Tanjong Mingari; Sigemerai, with two peaks, 1,716 and 1,759 feet (523^m1 and 536^m2) high, about $7\frac{1}{2}$ miles farther north-eastward; Tawerei, with a round summit, 2,153 feet (656^m3) high, about 23 miles south-eastward of Sigemerai; the two sharp peaks of the Tantiri gebergte, 2,078 feet (633^m4) high, $7\frac{1}{2}$ miles southward of Tawerei; and Wiwi, 3,725 feet (1135^m4) high, about 12 miles south-south-eastward of Tantiri gebergte. On the southern side of the head of the gulf are the Soewoeri (Suwuri) gebergte, 2,271 feet (692^m2) high, and farther southward are Wagoera and Koté. In the foreground $6\frac{1}{2}$ miles west-south-westward of Tantiri gebergte, is Top Modan, on the south-western side of an island, 926 feet (282^m2) high. See view facing page 219.

Tidal streams.—The tidal streams in Golf van Bintoeni turn usually at the times of high and low water. About 5 miles within the entrances of the arms of the sea it may be slack water for about 2 hours about the time of high water. In the lower reaches of these arms, at the strength of the stream there is little difference in the rate of the in-going and out-going streams. The streams at the beginning of the flood and the last of the ebb follow the direction of the channels, but while the banks, which dry, are covered, they set obliquely through the entrances.

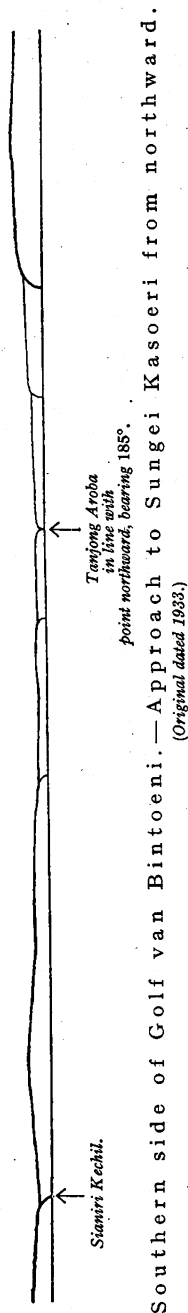
The greater the range, the stronger are the tidal streams. The maximum observed rate in the basin of the gulf was 3 knots; in the arms of the sea the rate is very variable and often considerably more than 3 knots.

Northern shore.—The most important rivers on the northern shore are the Kamarin, Rittowé and Wasian, which flow out about 20, 33 and 37 miles respectively, eastward of Tanjong Mingari (*Lat.* $2^{\circ} 18' S.$, *Long.* $132^{\circ} 56' E.$). The mouths of the rivers, which are narrow, are difficult to identify; inside, the depths are considerable.

Charts 3242, 942b, 2759a.



Approach to head of Golf van Bintoeni.
(Original dated 1933.)



Southern side of Golf van Bintoeni.—Approach to Sungei Kasira from northward.
(Original dated 1933.)



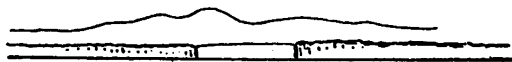
Southern side of Golf van Bintoeni.—Approach to Sungei Kaitero from west-north-westward.
(Original dated 1933.)

Chart 3743.

The Kamarin can be entered by steering for its western entrance point, bearing 008°, which leads in a least depth of 5 feet (1^m5) ; close within the mouth the river divides into two branches and becomes very narrow. To enter the Rittowé, a vessel should steer for the point 5 between the Rittowé and the Wasian, bearing 007°, until the western entrance point bears 000°, when she should steer for the entrance, closing the eastern bank ; there is a least depth of 23 feet (7^m0) in the channel. Inside the entrance the river curves westward. The Wasian has a straight channel, with a least depth of 18 feet (5^m5) in the fairway. 10 To enter, a vessel should steer for the middle of the mouth, bearing 015° ; the depths increase rapidly inside.

Owing to the large rise and fall of the tide at the head of the gulf the appearance of the points vary remarkably with high and low water, and the muddy points are in some cases covered with very low man- 15 groves, rendering them difficult to identify.

Sungei Moetoeri (Muturi) is the most important of the sea arms on the northern side of the head of the gulf, as the Sungei Komano flows into its northern side, and Moetoeri village, the native centre of trade, stands on its banks. A vessel approaching Sungei Moetoeri should 20 keep the first two points on the north-western side of the channel in line, which will lead north-westward of the bank with depths of less than 3 fathoms (5^m5) extending about 3 miles south-westward from Tanjong Kabarisi, the conspicuous point situated about 7 miles south-eastward of the entrance to Sungei Wasian. When this point bears 25 090° the vessel should gradually alter course eastward, and when the entrance is open she should steer for the north-eastern point of the alignment mentioned above, bearing 052°. With good visibility, the



Hill open south-eastward of point, bearing 052°.

(Original dated 1933.)

summit of a group of hills, not shown on the chart, will be seen eastward above the point. 30

Southern shore.—Inside the entrance of Golf van Bintoeni the character of the southern shore changes, the marshes continue, but they are interspersed by wide salt-water channels ; the principal of these from west to east are :—Kasoeri, Kasira and Kaitero, which all extend southward. Eastward of Kaitero, a short, wide, but shallow 35 arm, penetrates the land, and into which the Sungei Wagoera, Sungei Weperar, and Sungei Wemoi flow.

To enter Sungei Kasoeri, a vessel, after rounding the northern point of Asap, an island situated close offshore about 12 miles eastward of Tanjong Tanah Merah (*Lat. 2° 26' S., Long. 133° 02' E.*), should steer 40 for the south-western point of Sianiri Kechil, situated 3 miles eastward of the southern extremity of Asap, bearing 142° ; as the mouth of the Kasoeri opens she should alter course southward and keep Tanjong Aroba, on the western side of the river, in line with the point on the eastern side, bearing 185° (*see view facing this page*), which leads 45 between the shoals in the entrance, but care must be taken to avoid

Charts 942b, 2759a.

Chart 3743.

the bank which was reported, in 1938, to be extending eastward from the eastern side of Asap. Inside the river there are no difficulties.

- 5 There is a shorter route, however, with charted depths of not less than 4 fathoms (7^m3), through Tanoesan Wimaro, between Asap and the mainland, but the channel in its approach is narrow, and the banks on either side steep-to; there are no marks and the stream sets across it, so it is unadvisable to attempt it without local knowledge. The
10 southern shore should be held where it enters the Kasoeri.

Sungei Senindara, which flows into Tanoesan Wimaro, has a wide mouth, but it narrows after the first bend. There is a steep-to bank extending from Asap, opposite the eastern entrance point of the Senindara. Traders visit this river on account of the profuse growth
15 of the gum trees.

The eastern side of the bank which extends 1½ miles northward from Sianiri Kechil is marked by three unofficial beacons, each surmounted by a white ball; an unofficial beacon, surmounted by a black cone, marks the western side of the shoal extending northward from the
20 coast forming the eastern side of the entrance to Sungei Kasira.

To enter Sungei Kasira, a vessel from westward, after rounding the northern point of Asap should steer for the south-western extremity of Amoetoe (Amutu) Besar, bearing 118°, until the western extremity of Sianiri Kechil is abeam, when she should alter course gradually
25 southward and steer for the second point on the eastern side of Sungei Kasira, bearing 175° (*see view facing page 219*), until the passage between Sianiri Kechil and Sianiri Besar bears 270°, when she should steer southward into the Kasira. When leaving, the eastern shore should be held.

- 30 Babo, a large village, at which there is a pier, with a shed on its head, is situated on the western side of Sungei Kasira; there is another pier about half a mile southward. A buoy, for the use of aircraft, is moored about 2 cables northward of the pier at Babo.

Sungei Kaitero.—Sungei Kaitero is the most important river on
35 the southern side of Golf van Bintoeni, its upper reaches being well populated. When near the mouth, the higher land behind the marshes can be seen. Amoetoe (Amutu) Kechil divides the entrance into two channels. The eastern passage is narrow and shallow, but the western one is wide and deep; outside the entrance the approach is divided
40 by Amoetoe Besar; the eastern branch, named Taridoera, runs between Amoetoe Besar and Amoetoe Kechil, and the western branch between the southern side of Amoetoe Besar and the mainland.

Approaching the Kaitero by the western passage, when north-eastward of Sianiri Kechil, a vessel should steer for the southern extremity
45 of Amoetoe Besar, bearing 110° (*see view facing page 219*), which will lead between the shoals in the eastern part of the channel; after passing close along this southern point, she should steer for Amoetoe Kechil (*Lat. 2° 31' S., Long. 133° 38' E.*) and subsequently south-south-eastward into the Kaitero. The first bluff on the western side
50 of the river should be passed close to, on account of the drying banks which lie in mid-channel.

On leaving the Kaitero and proceeding by the western passage, southward of Amoetoe Besar, after having rounded the southern point of that island, if it is clear, a vessel should steer for the northern point of

Chart 3743.

Asap, bearing 293°, otherwise keep the southern point of Amoetoe Besar bearing 110° astern, until north-eastward of Sianiri Kechil.

A vessel using the Taridoera channel should steer for the north-eastern extremity of Amoetoe Kechil, bearing 126°, altering course to 170° when the eastern extremity of Amoetoe Besar bears 180°; this latter course leads through the deepest part of the Taridoera and close along the eastern coast of Amoetoe Besar. The western side of the channel is steep-to, but the eastern side shoals gradually. When abreast the western extremity of Amoetoe Kechil the south-western coast of this island should be followed, afterwards proceeding as previously directed. 5 10

Head of Golf van Bintoeni.—Modan, an island, on the southern side of which there is a village of the same name, is rocky at its western extremity. A mudbank, which dries, extends about 7½ miles westward from the western extremity of Noesawammer (Nusawammer), an island, which lies about half a mile northward of Modan. On this mudbank there are two clumps of mangroves, the western of which, named Karaka, lies about 2½ miles from the western extremity of Noesawammer. 15

Straat Noesawammer is the passage between the island of the same name and Maniai, an island about half a mile northward. Its entrance, which lies between the mudbank which extends westward from Noesawammer, and a low island about 1½ miles northward, is fronted by a bar, with a depth of 10 feet (3^m0). Srewenoe, a rocky and moderately high islet, lies near the middle of the strait, about 5 miles eastward of Karaka. A vessel entering should keep the first point on the southern side of Maniai eastward of Srewenoe, midway between that islet and the southern side of Maniai; if, however, this mark is not plainly visible, she should keep on the northern side of the channel when passing Karaka. 20 25

Straat Modan, between the island of the same name and two islands southward of it, is deep, but is fronted by a bar at its western end, with depths of less than 3 fathoms (5^m5). A least depth of 14½ feet (4^m5) can be carried, with Top Modan bearing 095°; southward of this line of bearing the depths decrease gradually, but northward of it they decrease rapidly towards the ridge, over which there is a least depth of 2 feet (0^m6), which extends westward from Modan. 30 35

Anchorage may be obtained, in a depth of about 11 fathoms (20^m1), off Modan village.

Modan village is the headquarters of a Government official and the residence of the Rajah of Bintoeni. The house of the former stands on the steep slope of the hill behind the village. Sungei Jakati, which is narrow, flows into Straat Modan about 3 miles eastward of the village. On the southern side of the strait, opposite the village, is Sungei Soearawara (Suarawara), into which a number of creeks flow. 40

*Chart 3742.***WESTERN SIDE OF NEW GUINEA.—Coast.**—(Continued).— 45

The general aspect of the coast between Tanjong Fatagar (*Lat.* 2° 46' S., *Long.* 131° 55' E.) and Kaap van den Bosch, 98 miles south-eastward, is densely wooded, mountainous land, usually terminating in steep, rocky cliffs. The eastern side of Sebakor baai (page 224) is, however, considerably lower, with an upward gradient, forming a division between the mountainous Koemawa territory and that lying northward of Sebakor baai. The southern portion is practically 50

Chart 3742.

uninhabited ; farther north, there are a few villages, the inhabitants of which are more civilized as Fak Fak is approached.

The whole of this mountainous land is very uniform, so that there are few noticeable features from a distance, except the rocky islands off and westward of Fak Fak and the islands off Weri baai (page 224) and Sebakor baai. Gunong Baik, 3,448 feet (1050^m9) high, with a rounded summit, on the southern side of the entrance to Sebakor baai, and a conical peak, 3,297 feet (1004^m9) high, about 4½ miles northward of Kaap van den Bosch, may, however, be identified.

Chart 3743.

Off-lying islands and dangers.—Pisang eilanden, lying about 19 miles west-north-westward of Tanjong Fatagar, consist of Saboeda, four islets close together southward of it, and Tartaroega and Sentjan (Senchau), two rocky islets, 194 and 152 feet (59^m1 and 46^m3) high, lying about 2½ and 5½ miles, respectively, west-north-westward of the northern extremity of Saboeda. All are covered with vegetation and rise steeply from the sea.

Saboeda, which is 536 feet (163^m4) high, is fringed by a narrow reef. Tartaroega and Sentjan are also fringed by reefs, and in their vicinity are a number of shoals, with depths of from 2 to 3½ fathoms (3^m7 to 6^m9), the positions of which may best be seen on the chart. (See view facing page 223). There is a clear channel between Saboeda and the group of islets southward of it.

A 2½-fathom (5^m0) patch lies 2½ miles north-westward of Sentjan. Anchorage may be obtained during the South-east monsoon between the northern side of Saboeda and Tartaroega, but caution must be observed on account of the shoals in this vicinity. A sheltered anchorage during both monsoons may be obtained southward of Saboeda ; during the South-east monsoon, however, it is preferable to anchor off the northern side of Saboeda.

Chart 3742.

Coast.—The coast between Tanjong Fatagar and Tanjong Kokraaf, about 9½ miles southward, is divided into two bays by a tongue of land terminating in Tanjong Tegin. These points are all high, and inland of them the country is mountainous and thickly covered with vegetation (see page 221).

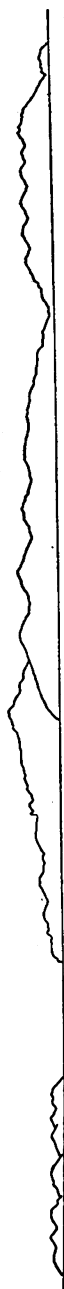
Batu Poetih (Putih), 505 feet (153^m9) high, rocky, and covered with vegetation, lies about three-quarters of a mile southward of Tanjong Kokraaf ; its western extremity is a conspicuous headland with white rocky cliffs. (See view facing page 223). A coral patch, with a depth of 16 feet (4^m9), lies about a quarter of a mile northward of the middle of the northern coast of the island.

Between Tanjong Kokraaf and Tanjong Riboettoetin, about 7 miles south-eastward, there are two bays, Telok Togarwatan and Telok Sipatnanam, separated by Tanjong Gangroerimoer, and which afford anchorage.

Chart 3742, plan of Channels near Panjang.

Between Tanjong Riboettoetin (Lat. 2° 58' S., Long. 132° 04' E.) and Fak Fak, 13½ miles eastward, the principal villages are Atti Atti Onin and Werpigang, 5 and 6 miles, respectively, east-north-eastward of Tanjong Riboettoetin ; the houses stand on piles in shallow water or on patches, which dry, and are connected to the coast by bamboo bridges, more than 100 yards (91^m4) long in places.

Charts 3242, 942b, 2759a.



Saboeda.
Pisang eilanden—North-eastern extremity of Saboeda, bearing 300° , 3 miles.
(Original dated 1933.)



Tanjong Fatagar,
bearing 356° , 19 miles.
Conspicuous
white
headland.
Batu Poth.
Tanjong
Gengroetmoer.
West coast of New Guinea.—Approach to McCluer gulf from southward.
(Original dated 1922.)



Ekka.
Bearing
 359° .
Pandjang.
West coast of New Guinea.—Approach to Fak Fak from westward.
(Original dated 1933.)



Toemboe Toemboe,
bearing 304° .
Adi.
South-west coast of New Guinea.—Approach to Straat Nautilus from south-eastward.
(Original dated 1933.)

Chart 3742, plan of Channels near Panjang.

Off-lying islands.—Light.—Ekka, situated with its western extremity about $1\frac{1}{2}$ miles south-eastward of Tanjong Riboettoetin, is a rocky and wooded island, bordered by a white beach. A reef, with a depth of 10 feet (3^m0) at its outer end, extends about half a mile east-south-eastward from the eastern extremity of the island. Between the island and the mainland there are several low, wooded islets lying on an extensive reef, and between this reef and the island there is a deep but narrow channel, which should only be used by vessels with local knowledge. 5 10

Pandjang, an island, the western end of which lies about $1\frac{1}{2}$ miles eastward of Ekka, with a deep channel in the fairway between, has a narrow ridge of hills extending along its entire length. A reef extends about a quarter of a mile from Tanjong Wamaroesa, the eastern point of the island. There is a deep and clear passage between this point and the mainland. The island is inhabited, principally by Chinese. See view facing this page. 15

A light is exhibited, at an elevation of 108 feet (32^m9), from a white iron framework structure, 42 feet (12^m8) in height, situated on Tanjong Wamaroesa. 20

Chart 3742 with plan of Channels near Panjang.

Reede Fak Fak and approaches.—Dangers.—Light.—Beacon.—A reef, with a depth of 5 feet (1^m5), lies about $5\frac{1}{2}$ miles southward of Tanjong Wamaroesa. A shoal, with a depth of 11 feet (3^m4), lies nearly a mile farther southward, and a shoal, with a depth of 8 feet (2^m4), lies about $1\frac{1}{2}$ miles westward of the reef. Between these dangers and Tanjong Wamaroesa there are a number of shoals with depths of from 6 to 11 feet (1^m8 to 3^m4), the positions of which may best be seen on the chart. Two reefs, with depths of 6 and 8 feet (1^m8 and 2^m4), lie about $6\frac{1}{2}$ miles south-eastward and $3\frac{1}{2}$ miles east-south-eastward, respectively, of Tanjong Wamaroesa; these reefs are marked by discoloration under favourable conditions. 25 30

Toebi (Tubi) Sérang is a rocky wooded islet lying near the outer end of a reef which dries, extending about 8 cables south-south-westward from a point on the mainland situated about $2\frac{1}{2}$ miles northward of Tanjong Wamaroesa. Near the inner end of this reef is Kéké, a rock above water. 35

Meti Meti rif, which dries and is steep-to, lies about one mile south-westward of the light structure at Fak Fak; it is marked on its south-eastern side by an unofficial white beacon surmounted by a cone. 40

The limits of the roadstead are the meridians through Meti Meti rif and Toebi Sérang and the parallel through the latter.

A buoy, for the use of aircraft, is moored about three-quarters of a cable south-south-eastward of the landing stage at Fak Fak.

A light is occasionally exhibited, at an elevation of 18 feet (5^m5), from a white iron framework structure, on the landing stage at Fak Fak. 45

Anchorage.—Directions.—Anchorage may be obtained, in a depth of 25 fathoms (45^m7), southward of Fak Fak. A vessel should approach the anchorage on a northerly course, and anchor when the steep point situated about 3 miles south-eastward of the light structure is seen midway between the northern extremity of Toebi Sérang (*Lat.* $2^{\circ} 57' S.$, *Long.* $132^{\circ} 18' E.$) and the southern extremity of Kéké, or on opening the channel between Ekka and Pandjang; the vessel will then lie about one cable from the steep-to coastal reef. 50

Chart 3742 with plan of Channels near Panjang.

Fak Fak.—This village stands on a hill, about 330 feet (100^m6) high, on the western side of the entrance of an inlet, into the head of which Sungei Fak Fak flows; this river usually dries for a distance of half a mile from its mouth.

Fak Fak is the headquarters of a Government official. Provisions are scarce. There is a hospital in the town.

The country in the vicinity of Fak Fak, unlike that elsewhere on this coast, is well populated.

10 Chart 3742.

Coast.—Oerat (Urat), an island separated from the mainland by Pinto Kechil, a very narrow shallow passage, lies about 19 miles south-eastward of Fak Fak. Semai, an island, 1578 feet (481^m0) high, is separated from Oerat by Pinto Besar, with a least width of about half a cable between the drying reefs on either side, and depths of over 11 fathoms (20^m1) in the fairway. Kawar Noewa (Nuwa), an islet about 1½ miles southward of the south-eastern extremity of Semai, is conspicuous.

Weri baai, entered between Oerat and Tanjong Kirana, about 4 miles southward, affords good anchorage during the South-east monsoon, in depths of from 22 to 27 fathoms (40^m2 to 49^m4). Weri village is situated at the head of the bay.

Off-lying dangers.—A reef, which dries, lies about 6 miles west-north-westward of Tanjong Kirana, and several reefs, with depths of from 11 to 18 feet (3^m4 to 5^m5), lie in the southern approach to Weri baai, within 2½ miles of the coast, the positions of which may best be seen on the chart.

Sebakor baai.—**Dangers.**—Sebakor baai or Rijklof van Goens baai, entered between Tanjong Toerkanggoer (Turkanggur), about 6 miles south-south-eastward of Tanjong Kirana, and Tanjong Tongerai, about 20 miles farther southward, affords anchorage during both monsoons anywhere under the lee of the points and islands.

Karas, an island, 1,605 feet (489^m2) high in its northern part, Toeboeroeasa (Tuburuasa), and Faoer (Faur), the latter 1,076 feet (328^m0) high at its southern end, divide the bay into two parts, the north-western of which is clear of dangers, as are also the channels between the islands; the eastern part, however, is encumbered with a number of shoals, which are all marked by discoloration under favourable conditions, extending as much as 2½ miles offshore in the northern part and 5 miles in the southern part, the positions of which may best be seen on the chart.

A 3-fathom (5^m5) patch lies about 4 miles west-north-westward of the north-western extremity of Karas.

Anchorage may be obtained, in depths of from 27 to 38 fathoms (49^m4 to 69^m5) off Mas, on the south-eastern side of Karas.

There are several villages on the islands, but the mainland is uninhabited.

Coast.—Gunong Baik, about 4 miles south-south-eastward of Tanjong Tongerai, has been described on page 222.

Between Tanjong Tongerai (*Lat. 3° 38' S., Long. 132° 42' E.*) and Kaap van den Bosch, about 29 miles southward, the coast is mostly inaccessible, and is uninhabited.

Anchorage may be obtained, in a depth of about 27 fathoms (49^m4), either northward or southward, according to the monsoon, of the islet

Chart 3742.

which lies on the coastal reef about $11\frac{1}{2}$ miles southward of Tanjong Tongerai. A shoal, with a depth of $6\frac{1}{2}$ fathoms (11^m9), lies about half a mile offshore about $1\frac{1}{2}$ miles southward of this islet.

Chart 3742, plan of Sanggala and Wap bays.

Sanggala baai and approaches.—Dangers.—This bay is entered between the northern extremity of Mommon, a peninsula extending north-north-westward from a position about 20 miles southward of Tanjong Tongerai, and a point about $1\frac{1}{2}$ miles north-eastward. It can be easily identified by a conspicuous waterfall which shows as 10 a white patch, on the mainland, about $1\frac{1}{2}$ miles northward of the entrance.

Two islets lie on a reef about one mile north-westward of the waterfall and about half a mile offshore, and a 26-foot (7^m9) patch lies about 6 cables westward of the waterfall. Several islets lie close off the 15 northern extremity of Mommon, and a spit, with a depth of 15 feet (4^m6) near its outer end, extends about 4 cables northward from the largest islet. A shoal, with a least depth of one foot (0^m3), and two patches which dry, southward of it, lie within the bay.

Anchorage may be obtained, in depths of from 16 to 22 fathoms 20 (29^m3 to 40^m2), during the South-east monsoon, between the 26-foot (7^m9) patch and the waterfall; also northward of the patch which dries, in the middle of the bay, in depths of from 16 to 27 fathoms (29^m3 to 49^m4), or southward of it, in a depth of about 18 fathoms 25 (32^m9), sand.

Wap baai.—This bay, lying on the southern side of the isthmus connecting Mommon to the mainland, is fronted by three islets lying close together on a bank, eastward of which a vessel may obtain anchorage, in a depth of 28 fathoms (51^m2). During the South-east monsoon the swell runs into the head of the bay. 30

Chart 3742.

Coast.—Between Wap baai and Kaap van den Bosch the coast is steep-to, but during the South-east monsoon anchorage may be obtained in a less steep part in a bight about 2 miles northward of Kaap van den Bosch; on the northern side of this bight there is a con- 35 spicuous rock, covered with vegetation. A rivulet, which dries at its mouth, flows out close to a similar rock on the southern side of the bight.

Charts 3742, 2102.

The mountain, about $4\frac{1}{2}$ miles northward of Kaap van den Bosch, 40 has been described on page 222.

Chart 2102.

SOUTH-WESTERN SIDE OF NEW GUINEA.—Coast.—Between Kaap van den Bosch and Tanjong Bohia, about 105 miles eastward, the coast forms a large bay, the north-western shore of 45 which is flat and fringed by shoals; between Tanjong Oesau (page 226) and Tanjong Simora (page 229) it is low and marshy; the north-eastern shore is high and steep, with considerable depths off it.

Tidal streams.—The tidal stream sets west-north-westward along the north-eastern shore with the rising tide. The streams in the outer 50 part of this large bay are weak, and increase in strength in the narrow channels and entrances to the smaller bays.

Coast.—The coast between Kaap van den Bosch (*Lat.* $4^{\circ} 05' S.$,

Chart 2102.

- Long. 132° 54' E.*) and Tanjong Oesau (Usau), about 21 miles eastward, is high, densely wooded, and steep. Noesa Woelan (Nusa Wulan) or Rulofs eiland lies close offshore between Kaap van den Bosch and Tanjong Papisoi, about 7 miles east-south-eastward. About 2½ miles north-eastward of Tanjong Papisoi is Derdi, a reef, which dries, with another patch, which dries, close northward of it and a 10-foot (3^m0) patch about half a mile westward. A 5-fathom (9^m1) patch lies one mile southward of Derdi.
- 10 Anchorage may be obtained during the West monsoon close offshore westward of Derdi, or in the bight north-eastward of the islet lying close offshore about 2½ miles north-north-eastward of Tanjong Papisoi. During the East monsoon anchorage may be obtained, in a depth of about 7½ fathoms (13^m7), on the ridge between Noesa Woelan and
- 15 the mainland.

Straat Nautilus and approaches.—Dangers.—This strait, separating Adi from the mainland in the vicinity of Tanjong Oesau, has a least depth of 7 fathoms (12^m8) in the fairway, which is about 1½ miles wide between Oerobi (Urobi), a rocky islet covered with high vegetation, situated 6 miles eastward of Tanjong Oesau, and the reef which

20 lies about one mile off the northern end of Adi.

Adi is a low island, with low hilly land without any conspicuous summits in the western part. (See view facing page 223). Toemboe Toemboe (Tumbu Tumbu) or Vogel eilandje, which is covered with

25 vegetation and fringed by a reef, which dries, lies about 8 miles westward of the southern extremity of Adi. Within 3 miles northward of the islet are several shoals with depths of from 3½ to 6 fathoms (5^m9 to 11^m0), and a 4½-fathom (8^m7) patch lies about 2½ miles south-eastward of the islet. A 4½-fathom (7^m8) patch lies about 2 miles west-south-

30 westward of the southern extremity of Adi.

A reef, which dries, lies about 1½ miles eastward of Tanjong Loematta (Lumatta), the north-eastern extremity of Adi, with a passage between, in which there is a depth of 10 feet (3^m0). A 1½-fathom (2^m3) patch and a reef, which dries, lie about 4½ and 6½ miles, respectively, east-

35 ward of Tanjong Loematta, and a 4½-fathom (8^m7) patch lies about 4 miles south-eastward of the same point and nearly 2 miles offshore. A reef, with a depth of 6 feet (1^m8), lies about 14 miles south-eastward of Tanjong Loematta.

A rocky islet lies one mile westward of Oerobi; Oenoga (Unoga)

40 and Noes (Nus) Tiga are rocky islets lying about 1½ miles north-north-westward and 3½ miles north-north-eastward, respectively, of Oerobi. A reef, with depths of less than 3 fathoms (5^m5), lies between Oenoga and the mainland. Karawatoe and Keliwala are low islets covered with high vegetation, each fringed by a reef, which dries; they lie on

45 the outer edge of a bank, with depths of less than 10 fathoms (18^m3), which extends about 10 miles offshore, about 6½ and 10½ miles, respectively, east-north-eastward of Oerobi. Two 3½-fathom (5^m9) patches lie about 3½ and 4½ miles, respectively, north-eastward of Keliwala, and a 5-fathom (9^m1) patch lies about 2½ miles northward of the same

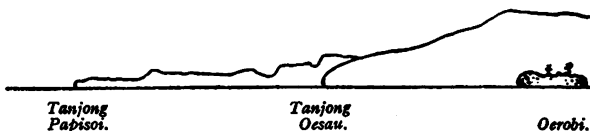
50 islet. There are several shoal patches between Keliwala and the mainland, the positions of which may best be seen on the chart.

Tidal streams.—In Straat Nautilus and southward of Adi, the tidal streams set eastward with the rising tide, and west-north-westward with the falling tide. At times, the sea breaks over the entire

Chart 2102.

width of the strait, owing to the tidal streams meeting from three different directions.

Directions.—A vessel approaching Straat Nautilus from westward should keep the south-eastern extremity of Oerobi in line with the north-western extremity of Karawatoe, bearing 067° , until Tanjong Oesau (*Lat. $4^{\circ} 04' S.$, Long. $133^{\circ} 14' E.$*) is in line with the southern fall of a conspicuous table mountain, bearing 268° , when she should alter course eastward and keep these marks in line astern, which will



Tanjong Oesau in line with the southern fall of a table mountain, bearing 268° .

(Original dated 1933.)

lead between Oerobi and the dangers northward of Adi. Care must be taken not to deviate from this line as the tidal stream sets across the channel in this vicinity.

Karoefa rivier.—This river, which drains the wide marshy district between Sebakor baai and Kamrau baai (*see below*), flows out 14 miles north-eastward of Tanjong Oesau. During 1911, the in-going and out-going tidal streams were observed to flow regularly, even during neaps.

Vessels not exceeding 164 feet (50^m0) in length can navigate the Karoefa for 16 miles from its mouth; beyond this point, although there is sufficient depth, the channel becomes narrow. A wide bar, over which there was a depth of 10 feet (3^m0) in 1911, fronts the river mouth. A depth of about 15 feet (4^m6) can be reckoned on at mean sea level.

To cross the bar a vessel should steer for the southern entrance point at Tagiri village, bearing about 305° , or with the north-eastern extremity of Keliwala astern, bearing 125° , until a depth of more than 16 feet (4^m9) is obtained, when she should alter course northward; there are some stakes, situated on the edge of the reef which dries, off Tagiri village, which may be passed fairly close-to. Care must here be taken to avoid a small dangerous rock, which dries, lying on the northern side of the channel.

The water is very muddy, and there is no discoloration. There are two detached reefs in the river, but they can be avoided by holding close along the left bank. For the greater part, the banks are covered with mangroves. Many small creeks flow into the river. Above Kanaka village, close within the entrance, there are no signs of habitation.

Anchorage.—Anchorage may be obtained during the North-west monsoon, in depths of from $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms (6^m9 to 7^m8), anywhere on the extensive mud flat which extends more than 5 miles from the low, marshy coast between the entrance to the Karoefa rivier and Kamrau baai.

Kamrau baai and approaches.—**Dangers.**—This bay is entered between Tanjong Taronmeta (*Lat. $3^{\circ} 34' S.$, Long. $133^{\circ} 34' E.$*), a low point, situated about 22 miles north-north-eastward of the entrance

Chart 2102.

to the Karoefa rivier, and Tanjong Simora, a low point, about 9 miles south-eastward of Tanjong Taronmeta.

A $4\frac{1}{2}$ -fathom (8^m7) patch lies about $13\frac{1}{2}$ miles southward of Tanjong Simora; a $6\frac{1}{2}$ -fathom (11^m9) patch with a $3\frac{1}{2}$ -fathom (5^m9) patch, 2 miles north-westward of it, about 10 miles southward, and a $4\frac{1}{2}$ -fathom (8^m7) patch about $3\frac{1}{2}$ miles southward of the same point.

On the western side of the entrance, on an extensive bank, which dries, are Madais Besar and Madais Kechil, low islets covered with high vegetation, with another rock, covered with vegetation, between them. Noes Toemba (Nus Tumba), a rock above water, lies on the drying reef which extends about $1\frac{1}{2}$ miles southward from Tanjong Taronmeta. Serotte, a low islet, covered with high vegetation, lies at the northern end of a ridge which divides the entrance into two channels, about $3\frac{1}{2}$ miles eastward of Tanjong Taronmeta (*Lat.* $3^\circ 34' S.$, *Long.* $133^\circ 34' E.$).

The western channel should not be used as it is encumbered with reefs. There is a 3-fathom (5^m5) patch in the entrance to the eastern channel, about one mile south-westward of Tanjong Simora. Above Serotte, the western side of the channel is steep-to, whilst on the eastern side there is a reef, which dries in places. A 5-foot (1^m5) patch, not marked by discoloration lies off the entrance to Argoeni baai, about 6 miles northward of Serotte.

Ombwallar rivier and Irimawa rivier, which flow into the north-western part of Kamrau baai, are more in the nature of arms of the sea and drain the extensive marshy land. The Ombwallar, as far as it has been surveyed, and its approach from Kamrau baai are easily navigated, but the Irimawa is difficult as the edges of the banks on either side are steep-to, and the water is muddy, so that the sunken dangers cannot be seen.

Argoeni baai.—Dangers.—This bay, which is entered at the head of Kamrau baai, close southward of Sjiernoese (Shirnusu), extends about 40 miles northward.

The greater part of the shore in the southern portion is steep-to, although high only in a few places; the western side of the northern portion is everywhere low; the eastern side is moderately steep, rocky, and densely covered with vegetation. There are several mountains on the eastern side of the bay, Genofa, 4,076 feet (1242^m4) high, with a conical peak, being the southernmost. Argoeni baai is much more thickly populated than other parts of the coast in the vicinity, and the villages, larger and more prosperous; in the northern part they are nearly all built out into the sea on piles over the shore reef and connected to the shore by bridges of tree trunks.

Argoeni baai is difficult to navigate, particularly the southern portion, unless it has been previously buoyed; the heavy swirls make it difficult to keep a vessel on her course, and the muddy water makes it impossible to detect any dangers. The junction of Kamrau baai and Argoeni baai is about half a mile wide, and is obstructed south-eastward of Sjiernoese in the entrance by four dangerous reefs, three of which are only a few yards in diameter and very steep-to; three of them dry and one has a depth of one foot (0^m3) over it.

According to information from the natives, a day's journey up the river at the head of Argoeni baai leads to the upper reaches of two streams, along one of which a prau can reach Mc Cluer gulf, and along the other, Geelvink baai.

Chart 2102.

Directions.—Argoeni baai may be identified by Genofa (*Lat. 3° 17' S., Long. 133° 41' E.*), which is visible from all directions, and the entrance may be clearly seen. A vessel should not attempt to enter at the full strength of the tidal stream; the best time is about one hour after low water, when the three westernmost reefs in the entrance are still visible, and the out-going stream is less felt. Slack water, which only lasts for a few minutes, occurs from 1½ to 2 hours after high and low water. 5

A vessel should enter with the north-western extremity of Loem (Lum), an islet situated close off the southern shore about 2½ miles eastward of Sjiernoeseo, in line with an islet, bearing 062°, about one mile east-north-eastward of the southern extremity of the same island, and continue on this line until the western side of the point close westward of Namasan village, situated 1½ miles southward of Sjiernoeseo, is in line with the western extremity of the island northward of the village, bearing 190°, which will lead in a least depth of 26 feet (7^m9). 15

Thence the western shore should be kept at a distance of not less than 1½ cables; the eastern side is less steep-to and can be picked up by sounding. When near the islet close to the western shore, abreast the grey patch, about 3½ miles northward of Loem, she should cross over to the eastern shore, which can be closely approached northward of the patch. At low water the rocks, which dry, on the southern end of the reef near the western shore can be easily seen. The vessel should not attempt to pass through the narrow part between the two Ajar Poetar (Ayar Putar) villages, situated on the eastern side, about 2½ and 4 miles, respectively, northward of the grey patch, at the strength of the tidal stream, on account of the tide-rips and swirls; she should close the eastern shore here, to avoid the drying rock on the western side. 20 30

In the straight stretch between Berdaha village, about three-quarters of a mile northward of the northern Ajar Poetar village, and Nagoera village, on the western shore about 5 miles farther northward, there are no dangers except a rock, which dries, close off the eastern shore about 2½ miles northward of Berdaha, and a reef, with a least depth of 3½ fathoms (5^m9), extending south-south-westward from the same shore, about three-quarters of a mile farther northward. 35

After passing this reef the vessel should steer to pass midway between the eastern shore and three islets off Tanjong Nagoera, thence bring this point in line astern with the eastern side of the southernmost of the three islets, bearing 205°, which leads westward of two rocks, which dry, lying about one mile north-north-eastward of the point. After passing Tanjong Nagoera the tidal stream suddenly slackens. Thence the vessel must be guided by the chart. A rocky reef, which dries, extends from the southern extremity of Soesoenoë (Susunu), an island close off the western shore, 11 miles north-north-eastward of Tanjong Nagoera, and also off the northern extremity of Faternoes, an island on the eastern side of the channel about 1½ miles south-eastward of Soesoenoë. The out-going stream sets on to both of these reefs. 45

Kaimana baai.—This bay is entered between Tanjong Simora and Tanjong Bitsjara (*Lat. 3° 44' S., Long. 133° 48' E.*), the steep termination of a high tongue of land extending south-south-eastward, about 8 miles south-eastward. Tanjong Simora and the western side of the bay are fringed by a wide reef, which dries, extending about 8 cables 50

Chart 2102.

offshore near the mouth of Sungei Air Tiba, about $2\frac{1}{2}$ miles north-eastward of Tanjong Simora, but it was reported, in 1933, that it probably extended farther than is charted. A $3\frac{1}{2}$ -fathom (5^m9) patch lies about 5 $1\frac{1}{4}$ miles south-eastward of Tanjong Simora, and a 2-fathom (3^m7) patch lies about $1\frac{1}{4}$ miles south-eastward of Simora village, situated close south-westward of Sungei Air Tiba. A reef, with a least depth of $3\frac{1}{2}$ fathoms (6^m4), extends about 7 cables southward from Tanjong Bitsjara, and a $2\frac{1}{2}$ -fathom (4^m6) patch lies about the same distance 10 westward of the point.

Sungei Air Tiba divides into two branches about one mile within its mouth, the right branch being navigable for about one mile, and the left branch for about 3 miles; there is little tidal stream in the river.

Reede Kaimana.—Beacons.—This roadstead is situated off 15 Kaimana village, on the eastern shore of Kaimana baai, about 5 miles north-north-westward of Tanjong Bitsjara. The edge of the drying reef, which extends about half a mile off Tanjong Poweri, close southward of Kaimana village, is marked by three unofficial beacons.

There is a conspicuous mosque in Kaimana village, also a conspicuous grotto southward of it. On nearing the village, the corrugated iron roof of the Custom house and a flagstaff near it will be identified. Kaimana is the headquarters of a Government official and is the residence of the Rajah of Komisi. There is a pier at Kaimana, with a depth of 5 feet (1^m5) at its head.

25 A vessel approaching the roadstead should keep westward of the alignment of the beacons, as the coastal reef extends farther southward and westward of the southern beacon. Northward of the northern beacon there are sufficient depths for a sheltered anchorage to be obtained, and a vessel can anchor, in a depth of 5 fathoms (9^m1), with 30 the two southern beacons in line and about one cable from the pier-head.

Coast.—Bitsjara baai, entered between Tanjong Bitsjara and the northern extremity of Namatotte, an island about $3\frac{1}{4}$ miles east-north-eastward, is backed by high land. (See view facing page 232). Two shoals, with depths of 16 feet (4^m9) and 5 feet (1^m5), lie in the middle 35 of the bay, about $4\frac{1}{4}$ and 5 miles, respectively, north-north-eastward of Tanjong Bitsjara. There are also some dangers on the eastern side of the entrance at the northern end of Koningin Sophia straat. Besan village is situated on the southern side of the entrance to Sisian-dang rivier, which flows into the bay on the western side near the 40 head. Sisi village stands at the head of the bay.

Koningin Sophia straat.—Anchorages.—This strait, separating Namatotte from the mainland, connects with Bitsjara baai at its northern end and with Triton baai at its southern end. Both sides of the strait are high and rocky.

45 Namatotte has a narrow mountain range which slopes steeply to the sea, except near its northern end which is lower and less steep. Platte berg, 808 feet (246^m3) high and flat-topped, situated at the southern end of the island, is conspicuous. The passage between the southern extremity of Namatotte and Sagin (*Lat. $3^{\circ} 52' S.$, Long. $133^{\circ} 55' E.$*), 50 an islet, 402 feet (122^m5) high, should not be attempted.

The northern end of the strait is encumbered with reefs and should not be used. It was reported, in 1939, that the coastal reef extended nearly $1\frac{1}{2}$ cables farther northward and eastward from the northern extremity of the island than is shown on the chart.

Chart 2102.

The tidal streams are sometimes strong, especially in the northern part, where eddies and whirlpools frequently occur in the vicinity of the reefs.

Anchorage may be obtained in most parts of the strait. Raaf (Raf) 5
baai, on the eastern side, affords a safe anchorage to small vessels with local knowledge at all times. The entrance, however, is narrow, and a reef, which dries about 3 feet (0^m9), and is, at other times, marked by discoloration, extends from the northern side, and there are several reefs in the inner part of the bay. At the head there is a narrow 10
channel, navigable for boats, leading to the mouth of a river.

Anchorage may be obtained by small vessels with local knowledge in Java baai, at the southern end of Namatotte, in a depth of about 10 fathoms (18^m3); the bay is very confined, however, and the anchorage is not out of the influence of the tidal streams. 15

Triton baai.—This bay is entered between Tanjong Aiwa, the eastern entrance point of the southern end of Koningin Sophia straat, and the north-western extremity of Aidoema (Aiduma), about 6½ miles south-eastward. The shores are high and rocky, except at the head, where Tombona rivier flows out. See view facing page 232. 20

Several islets lie in the entrance of, and inside, the bay, but except for Noesoeroemi (Nusurumi), situated in the middle of the bay, from the eastern side of which a reef extends, they can all be closely approached. Maoewara (Mauwara) and Semisarom lie on the western side; the channel between them and that between Maoewara and the 25
mainland are not navigable by large vessels and the latter is even difficult for boats.

A 3-fathom (5^m5) patch lies about half a mile southward of Laoezaro, an islet situated about 2½ miles westward of the north-western extremity of Aidoema. A 3½-fathom (6^m9) patch lies about 1½ miles north- 30
north-eastward of the latter point.

There is a village on Ambasinsi, close off the south-eastern side of the bay; this is the only inhabited island.

Good anchorage may be obtained at the head of the bay off Lobo village, and also in the eastern part of the bay, in the narrow passage 35
between two islets and the mainland. Vessels proceeding to the anchorage off Lobo, after rounding Tanjong Koemoera (Kumura) on the western side, should close the western shore, as the south-western edge of the reef, which dries, off the mouth of the Tombona rivier, is very steep-to, and, owing to the muddy water, cannot be distinguished. 40

The small inlet close northward of Tanjong Aiwa is only accessible for small craft.

Straat Iris.—Anchorages.—This strait, separating Aidoema from the mainland north-eastward, is deep in the fairway and clear of dangers, but the tidal streams are strong, especially in the north- 45
western entrance, off Saroeë Noes (Saruë Nus), an islet close off the north-eastern extremity of Aidoema, where the navigable channel is only half a mile wide.

There are two peaks on Aidoema, the higher of which has an elevation of 1,622 feet (494^m4), but they are difficult to identify. Aidoema 50
village (Lat. 3° 55' S., Long. 134° 02' E.) stands on the north-western extremity of the island. The north-eastern shore of the strait is uninhabited.

Anchorage may be obtained by vessels with local knowledge, in the

Chart 2102.

inlet on the north-eastern side of the strait, about $3\frac{1}{2}$ miles eastward of Saroeë Noes, also in Mangkawoe, an inlet, about $6\frac{1}{2}$ miles farther south-eastward.

- 5 The inlet on the north-eastern side of Aidoema, entered $4\frac{1}{2}$ miles south-eastward of Saroeë Noes, affords good anchorage for a small vessel with local knowledge, but it is restricted by the coastal reef, with a depth of 11 feet (3^m4), which extends some distance offshore.

- Dramai, an island lying south-eastward of Aidoema and in the southern entrance to Straat Iris, is hilly and partially cultivated. Moderately good anchorage may be obtained, in a depth of 13 fathoms (23^m8), off Boasei (Buasei) village, near the north-western point of the island, which is low compared with the other part. Southward of the village is a creek, which probably flows through to the west coast.

- Kajoe Merah baai.**—Kajoe Merah baai (Kayu Merah bay), entered between Tanjong Nambima, a high and steep point, situated about 3 miles eastward of the southern extremity of Dramai, and Tanjong Awoera (Awura), about 12 miles farther eastward, is fronted by Kajoe Merah, an island, which has two conspicuous peaks, 1,819 and 1,248 feet (554^m4 and 380^m4) high, on its southern side. The southern and western sides of the island are steep and rocky, elsewhere it slopes gradually. Close westward of the western extremity is Salakoela, an island, with a deep channel about 3 cables wide between it and Tanjong Wandala, situated 2 miles north-eastward of Tanjong Nambima; there is no navigable channel between Salakoela and Kajoe Merah. Several islets lie on a reef, which dries, close off the northern point of Kajoe Merah; the passage between them and the point is only suitable for boats.

- 30 On the western side of the bay, entered between Tanjong Wandala and Tanjong Sawara Sekai, about $3\frac{1}{2}$ miles north-north-eastward, is an inlet clear of dangers, the shores of which are bordered by high cliffs. Ojatan village is situated on the north-eastern shore about $1\frac{1}{2}$ miles westward of Tanjong Sawara Sekai.

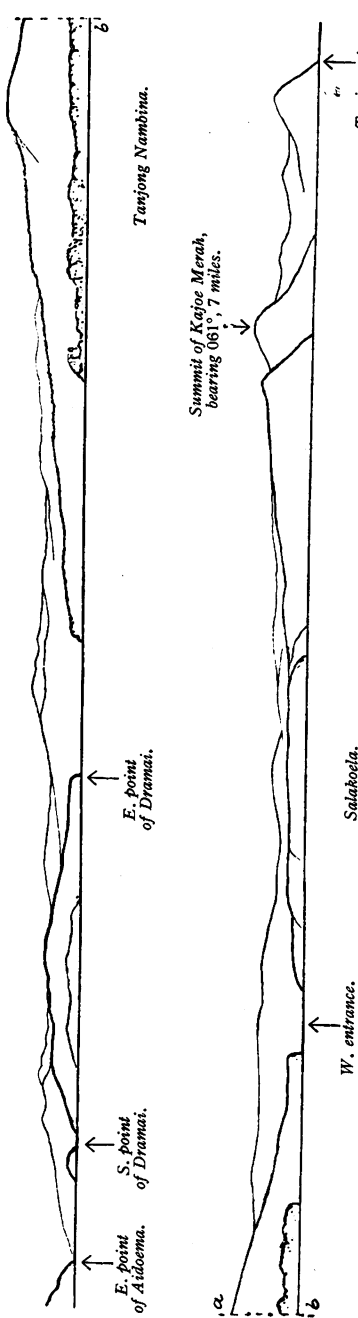
- 35 Southward of Tanjong Wikromboes, about 3 miles northward of Tanjong Sawara Sekai, is a small bay, almost closed by a reef extending 6 cables south-south-eastward from that point, and by a one-fathom (1^m8) reef, lying in the entrance. North-westward of Tanjong Wikromboes, at the head of the bay, Airawoi rivier, navigable only by boats, flows into a small cove, the shores of which are covered with mangroves. At low water, when the reefs can be seen, this cove can be entered.

- Three islets lie in the middle of the eastern entrance of Kajoe Merah baai, with a deep and clear channel on either side of them. The eastern shore of the bay between Tanjong Awoera and Tanjong Ferai, about $5\frac{1}{2}$ miles north-westward, is steep and rocky, thence to the entrance to Airawoi rivier, it is mostly low, fringed by a reef which dries, and covered with mangroves; farther inland the mountains rise steeply. See view facing this page.

- 50 Two rocks, with depths of $4\frac{1}{2}$ and $1\frac{1}{2}$ fathoms (8^m7 and 2^m3), lie about 2 and $2\frac{1}{2}$ miles, respectively, north-westward of Tanjong Ferai (Lat. $3^\circ 58' S.$, Long. $134^\circ 26' E.$). The western extremity of the islet, lying about $1\frac{1}{2}$ miles north-westward of Tanjong Awoera, in line with the north-eastern extremity of the northern large islet lying off the



South-west coast of New Guinea.—Approach to Bitsjara baai from south-westward.
(Original dated 1933.)



South-west coast of New Guinea.—View, in two parts, of approach to Kajoe Merah baai from west-south-westward.
(Original dated 1933.)

Chart 2102.

eastern extremity of Kajoe Merah, bearing 127° astern, leads south-westward of these dangers.

Bocht van Lakahia.—This bay is entered between Tanjong Awoera and Tanjong Bohia, about $8\frac{1}{2}$ miles south-eastward. Lakahia, lying 5 in the entrance, is a low island covered with high trees, and fringed by a reef, which extends about one mile from its western side.

Tanjong Awoera is steep and rises close within to an elevation of 1,596 feet (486^m5). Tanjong Bohia is low, and from it a spit, which dries, extends about one mile westward, and a bank, with depths of 10 less than 5 fathoms (9^m1), extends about $3\frac{1}{2}$ miles south-westward. Bohia, a hill, 359 feet (109^m4) high, lies about $1\frac{1}{2}$ miles east-south-eastward of Tanjong Bohia. The western shore of the bay is high and steep, but the eastern shore is low and mostly occupied by an extensive bank with depths of less than 3 fathoms (5^m5). 15

The channel between Tanjong Bohia and the island Lakahia is very narrow at the northern end, and very steep-to off the reef extending from the north-eastern point of the island; this passage should not be used without local knowledge. The entrance between the island Lakahia and Tanjong Awoera is wide and deep. Tanjong Tarella, 20 about 8 miles north-north-eastward of Tanjong Bohia, is a low, wooded, sandy point, about half a mile south-westward of which there is a sandbank, which dries. About three-quarters of a mile farther westward is Karang Japbari, with a least depth of $1\frac{1}{2}$ fathoms (3^m2).

There is a deep, though narrow channel to Etna baai, close along 25 the western shore, but it is not recommended on account of a rock, over which there is a depth of 2 feet (0^m6), off Tanjong Etaboeri, about $6\frac{1}{2}$ miles east-north-eastward of Tanjong Awoera, and a sandbank, with a depth of $1\frac{1}{2}$ fathoms (3^m2) over it, situated north-eastward of Tanjong Wariwi, about $2\frac{1}{2}$ miles farther north-eastward. A safer passage, with 30 a depth of 6 fathoms (11^m0), lies between the bank, which dries, westward of Tanjong Tarella, and Karang Japbari.

Anchorage.—Directions.—There is good holding ground everywhere in Bocht van Lakahia. During the South-east monsoon the swell runs north-north-westward, but a fair berth may be obtained off 35 Kambelangan rivier, on the northern side of the bay, about $4\frac{1}{2}$ miles north-eastward of Tanjong Awoera. During the North-west monsoon there is good anchorage eastward of Tanjong Amanmawa, about $2\frac{1}{2}$ miles east-north-eastward of the same point.

A vessel approaching from southward can identify the entrance of 40 Bocht van Lakahia by the mountain ridge of Boeroe (page 235), which is isolated and close to the coast, and cannot be mistaken for the high coastal mountains farther westward, nor for the islands westward of the bay. When nearing the coast, Bohia hill will be sighted before the land between Tanjong Bohia and Tanjong Nariki (chart 942b), 45 about 14 miles east-south-eastward, then Lakahia and the entrance to the bay will be seen.

Etna baai.—Dangers.—This narrow, landlocked inlet is about three-quarters of a mile wide at its entrance between Tanjong Bawia (*Lat. $3^{\circ} 56' S.$, Long. $134^{\circ} 40' E.$*), situated 3 miles north-north-eastward 50 of Tanjong Tarella, and Tanjong Itéwi, both steep projections. The latter point is steep-to, but on the eastern side several rocks, which dry, extend nearly a cable offshore between Tanjong Oeloepala (Ulupala) and Tanjong Bawia, and a sandbank, which dries, lies close off Tanjong

Chart 2102.

Oeloepala. The northern side of the bay is mountainous, the highest point of Bamana gebergte, situated about $2\frac{1}{2}$ miles north-eastward of Tanjong Bawia, having an elevation of 4,496 feet (1370^{m4}); the shore is steep in places, but alternates with marshy land covered with mangroves. The southern side is similar to the northern, but the mountains lie in detached groups, which makes the coast more open, and has a perceptible effect on the weather conditions. In the western part of the bay, northward of the western entrance point, is a waterfall which falls gradually from a height of about 650 feet (198^{m1}). Emborra rivier flows out about one mile south-westward of the waterfall.

There is a settlement, on the northern shore, about one mile north-eastward of Tanjong Itéwi; there is a pier here with a least depth of 15 13 feet (4^{m0}) at its head.

Oremma rivier, the principal river in Etna baai, flows out on the southern side of the bay, southward of Tanjong Jaramabonga, about $4\frac{1}{2}$ miles eastward of Tanjong Bawia, and is navigable for about 3 miles; the banks are mostly mud. The Oewawa (Uwawa) rivier flows out on the northern shore opposite the Oremma, but it is unimportant and divides into several branches.

The depths in the bay vary considerably, the narrowest parts being the deepest; the eastern part of the bay is shallow, but a channel, with depths of more than 5 fathoms (9^{m1}), extends to within $5\frac{1}{2}$ miles of the head, and 3 fathoms (5^{m5}) can be carried 3 miles farther.

No settled habitations were seen in Etna baai at the time of its survey, but traders from Ceram and the adjacent islands erect temporary huts during their stay.

A 4-fathom (7^{m3}) patch lies about 3 cables north-eastward of Tanjong Itéwi. A shoal, with a depth of 3 feet (0^{m9}), lies on the northern side of the bay about 3 cables offshore, close westward of Tanjong Saimba, situated about $3\frac{1}{4}$ miles eastward of Tanjong Bawia.

Northward of Tanjong Jaramabonga are two narrow banks of mud and sand, with depths of 2 and $2\frac{1}{2}$ fathoms (3^{m7} and 4^{m6}) over them, respectively, and 8 cables eastward of the northern of these banks is a 3-fathom (5^{m5}) patch, lying $1\frac{1}{2}$ cables offshore.

A steep-to reef which partly dries, lies in the middle of the narrow channel northward of the Seriwi gebergte, which are 1,816 feet (553^{m5}) high, situated about $2\frac{1}{4}$ miles south-eastward of Tanjong Jaramabonga; the deepest channel, which should be used, is southward of the reef.

A bank, over which there is a depth of less than 3 fathoms (5^{m5}), extends 4 cables offshore over a distance of more than a mile, from the western side of a point situated 6 miles eastward of Tanjong Jaramabonga.

Anchorage.—Directions.—Anchorage may be obtained anywhere in Etna baai; it is, however, not desirable to anchor in the narrow parts, nor in the bight at the western end northward of Tanjong Itéwi, on account of the swirls and bad holding ground.

After passing Tanjong Amanmawa a vessel should steer for Tanjong Tarella (*Lat.* $3^{\circ} 59' S.$, *Long.* $134^{\circ} 39' E.$), bearing 066° , passing over a bank, with a least depth of 23 feet (7^{m0}), until a depth of 6 fathoms (11^{m0}) is obtained, when she should steer 040° through the channel between Karang Japbari and the sandbank, which dries, off Tanjong

Chart 2102.

Tarella, until Tanjong Wariwi bears 285° , when she can steer for the entrance to Etna baai.

On entering Etna baai, she should keep on the deep western side by Tanjong Itéwi on account of the sandbank, which dries, between Tanjong Oeloepala and Tanjong Bawia, which considerably reduces the width of the navigable channel. As Tanjong Saimba opens clear of Tanjong Bawia, she should haul gradually eastward and, when about 2 miles eastward of the latter, keep on the southern side of the channel to avoid the bank westward of Tanjong Saimba. If the tidal stream is strong, she should give this point a good berth, on account of the eddies, and keep along its eastern side; as the channel up the bay eastward of Tanjong Jaramabonga opens out, she should cross over and keep along the northern side of that point and along the southern shore, until past the reef which dries in the narrowest part of the channel abreast Seriwigeberge, after which she should haul gradually over to the northern shore, until abreast the steep headland, situated $2\frac{1}{2}$ miles eastward of the reef, when she should keep a conspicuous spur of the mountains on the southern shore bearing 116° , which leads towards the head of the bay. The channel narrows here considerably, and is steepest on the northern side; hence it is advisable to sound constantly on the southern side of the channel and alter course as necessary.

Tidal streams.—The tidal streams in Etna baai are semi-diurnal and at springs usually have a rate of from 3 to 4 knots in the narrow parts. They follow the direction of the channel, and, where the turns are sharp, and, at the reef, which dries, in the narrow part of the bay, eddies are formed, necessitating careful steering; in the bight northward of Tanjong Itéwi, especially, the streams have a continuous turning motion.

Chart 942b.

Tanjong Bohia to Oeta rivier.—Coast.—The most conspicuous points on this stretch of coast are Tanjong Nariki and Tanjong Namariapi, about 14 and 38 miles, respectively, east-south-eastward of Tanjong Bohia. Tanjong Nariki is a spur from the mountain ridge of Boeroe (Buru), the summit of which is 4,567 feet (1392^m0) high, and lies about 6 miles eastward; this ridge runs in an easterly and westerly direction and is about 5 miles long. Tanjong Nariki may be identified by some large yellow patches on it.

There are several rivers on this part of the coast, one of which, the Omba, has two sandbanks, which dry, in its entrance; the outer one has a few bushes on its northern side. There is a channel on either side of these sandbanks; in the western there is only a depth of one foot (0^m3) and there is surf in it at high water; in the eastern there is a depth of 4 feet (1^m2), but these depths are liable to change. In 1910, a course 029° led through the eastern channel with the eastern entrance point just off the port bow until the bar had been passed, when the left bank was followed at a distance of from about 30 to 60 yards (27^m4 to 54^m9).

Between Tanjong Nariki (*Lat.* $4^{\circ} 14' S.$, *Long.* $134^{\circ} 50' E.$) and the entrance to Boeroe rivier, about 10 miles east-south-eastward, the coast is rocky, thence it becomes low with hilly land inland. There is a village on the eastern entrance point of Petawai rivier, about 8 miles south-eastward of Boeroe rivier, and a village stands on the eastern

Chart 2759a.

Chart 942b.

entrance point of Katéra rivier, which flows out about midway between Petawai rivier and Tanjong Namaripi.

- Tanjong Namaripi or Vlakke hoek (*Lat. 4° 27' S., Long. 135° 10' E.*)
 5 is a steep headland, appearing from eastward as an island.

Aspect.—From the vicinity of Tanjong Bohia, where the mountainous land reaches nearly to the coast, the entire coast eastward is low, muddy and covered with vegetation. The mountains are too far inland to be of any importance to navigation. The Charles Louis
 10 mountains run parallel to, and north-eastward of, the Boeroe ridge and extend eastward to the Sneeuw gebergte (Snow mountains), the western part of which is named Nassau gebergte, the highest peaks of which, from westward, are Idenburg Top, 15,270 feet (4654^m3) high, and covered with snow, and Carstensz Toppen, with two peaks, the
 15 higher of which has an elevation of 15,709 feet (4788^m1), both covered with snow. About 80 miles farther eastward, is the Oranje gebergte, with Emma Top, 15,469 feet (4714^m9) high, on which there is no snow; Wilhelmina Top, 15,584 feet (4750^m0) high, on which there is usually snow, about 12 miles east-south-eastward; and about 100 miles farther
 20 in the same direction, is Juliana Top, 15,489 feet (4721^m0) high, covered with snow. These mountains are seldom visible by day, except in the early morning or just after sunset, when they may be seen in clear weather as far south as lat. 5° 30' S., but they are usually covered by dense clouds.

- 25 **Coast.**—The vegetation on the generally muddy coast consists of mangroves varied by coconut trees, with occasional strips of sand by the sea. Behind the coast there is extensive marshy land, which extends as much as 40 miles inland.

Between Tanjong Namaripi and the mouth of the Oeta rivier, about
 30 50 miles east-south-eastward, several rivulets flow out, the principal being the Oemaar (Umar), Siéra and Perogo, 12, 25 and 32 miles, respectively from Tanjong Namaripi; there are a number of villages on this coast. There is a peak not far within the coast between the Siéra and Perogo, which is a useful mark when bearing between north-
 35 east and north-west. Westward of it there is a conspicuous flat ridge, which resembles a coffin. A salt water swamp extends behind the beach, which is overgrown with casuarina trees; this growth makes the coast at the mouth of the Perogo appear as a conspicuous point when navigating close offshore.

- 40 Oeta (Uta) rivier is about 3½ cables wide at its entrance and maintains a width of not less than one cable for a considerable distance. It is navigable by vessels of shallow draught as far as the confluence of the Biriri and Hijoeroekoe.

Oeta rivier to Pulau Naurio.—Coast.—Only the wider mouths
 45 of the rivers on this stretch of coast afford any landmarks; banks extend a considerable distance from some of them. Vessels anchoring off this coast when there is a somewhat high sea or swell should do so in depths of not less than 6½ fathoms (11^m9).

- The mouth of the Bokamau, about 8 miles east-south-eastward of
 50 that of the Oeta, is conspicuous. The western entrance point projects sharply, and the eastern point, from which a bank, which dries, extends 2 miles south-westward, appears as two islets; breakers have been seen on this bank about 2½ miles from the coast. A small bank, which dries, inside which there is a depth of 2 fathoms (3^m7), lies in the river

Chart 2759a.

Chart 942b.

entrance, the channel for boats running between it and the west bank. In October and November, 1904, the depth in the channel was 2 feet (0^m6). The river is not navigable.

Good anchorage may be obtained by vessels with local knowledge anywhere between the Oeta and Bokamau; the depths decrease rapidly as the latter is approached.

The rivers between the Bokamau and Mimika rivier, about 21 miles east-south-eastward, are only accessible for praus. During the South-east monsoon there is usually a considerable sea or swell here.

The mouth of the Mimika can be identified by an isolated, small round wood, near Kaukenau village (*Lat. 4° 42' S., Long. 136° 27' E.*), situated close westward. Caution is necessary when approaching, as the depths decrease rapidly. Good anchorage may be obtained by vessels with local knowledge, in a depth of 6 fathoms (11^m0), with the western entrance point of the river bearing 014°. The river is only available for small craft with local knowledge at high water. A narrow channel, winding between large sandbanks, which continually shift, leads to the mouth, which is about half a cable wide. In 1911, the channel was westward of the bank, which dries, lying in the middle of the entrance. The shores are low, marshy, and overgrown with mangroves; the banks at the entrance are bordered by a strip of sand, partly covered with trees, on which there are some primitive dwellings. A few miles up the river there is a large village, the inhabitants of which, in 1911, were friendly.

Keaukwa rivier flows out about 5 miles south-eastward of the Mimika, and a few miles farther is the mouth of the Timora. In the channels approaching both rivers there is a depth of not more than from 2 to 3 feet (0^m6 to 0^m9), and in the Keaukwa, depths of 6 and 6½ fathoms (11^m0 and 11^m9), varied by depths of from 4 to 6 feet (1^m2 to 1^m8) have been found. There are two villages at the mouth of the Timora. The banks of the Keaukwa consist of mangroves, with an occasional small sandy beach, on which the huts are built. A few miles up the river there are coconut and sugar-cane plantations.

About 6 miles south-eastward of the Keaukwa is the mouth of Atoeka rivier, in which there is an island. In 1904, there was a conspicuous white dead trunk of a tree on the western entrance point, visible from a considerable distance. Wania rivier, about 5 miles south-eastward of the Atoeka, has a very wide mouth, which is almost closed by an extensive bank, which dries, and is covered with vegetation. Some islets, on which there are high trees, lie in the mouth of the river. Moeraukwa village, standing on the coast about 1½ miles south-eastward of the mouth, is difficult to reach even in the smallest craft. About 5 miles north-westward of Pulau Naurio, the Aika rivier flows out through a wide mouth.

Wajeteri, Naurio and Poeriri (Puriri) are conspicuous islets lying westward of the wide mouth of Nêwérip rivier, which flows out eastward of Pulau Naurio. (*See view facing page 238*). Wajeteri and Naurio are covered with high trees; Poeriri is atoll-shaped and in the middle of it there is a basin, thickly covered with vegetation, with an opening on its western side; it is bordered by a high sandy beach. The bay eastward, into which the Nêwérip rivier flows, is shallow and is not accessible for vessels. Nêwérip rivier has not been examined.

A bank extends south-westward and southward from Pulau Naurio

Chart 2759a.

Chart 942b.

(*Lat.* 4° 56' S., *Long.* 136° 51' E.), a depth of 4 fathoms (7^m3) having been obtained about 5 miles southward of the mouth of the Aika rivier, and breakers were observed with a slight swell.

- 5 Anchorage may be obtained by vessels with local knowledge, in a depth of 5 fathoms (9^m1) off Pulau Naurio, with the western extremity of Poeriri bearing 005°, and the mouth of the Inaboeka rivier, 084°. The depths shoal rapidly from 10 to 4 fathoms (18^m3 to 7^m3), so it is advisable, when approaching the coast on a northerly course, to reduce
- 10 speed and sound continuously.

Pulau Naurio to Flamingo baai.—Coast.—The only conspicuous objects on this stretch of coast are Laag eiland and Klein eilandje, about 60 miles south-eastward of Pulau Naurio, and the trees at the mouths of the rivers Kasteel, Bloemen, Hellwig and Lorentz.

- 15 A mudbank, with depths of less than 3 fathoms (5^m5), extends from 12 to 13 miles offshore in places, and on which there are a number of shoal patches, which are described with that part of the coast off which they lie.

Many of the rivers form the only means of communication through
20 the extensive marshy land to the hills far inland. In the vicinity of the hills and northward of them they are unserviceable on account of obstructions, rapids and rocky banks. All these rivers are connected by streams, by which a boat with a draught of about 5 feet (1^m5) and a length of about 80 feet (24^m4) can proceed from the Otakwa rivier
25 (see below) to the Eilanden rivier (page 240), a distance of about 270 miles. There are few villages in this part; in the plain they are situated on the banks of the rivers. The inhabitants live by hunting, fishing and a little agriculture. Coconut trees are not seen anywhere.

Koepera Poekwa (Kupera Pukwa) rivier, with an entrance 3 miles
30 wide, flows out about 12 miles eastward of Pulau Naurio. An extensive sandbank, which dries and is steep-to, lies near the western entrance point of the river. Anchorage may be obtained by vessels with local knowledge with the eastern entrance point bearing 050°, distant 8 miles. Heavy breakers have been observed on the coast
35 between Nêwêrip rivier and Koepera Poekwa rivier.

Inaboeka rivier, which flows out about 5 miles south-eastward of Koepera Poekwa rivier, had, in 1903, a depth of 11 feet (3^m4) on its bar.

The following directions were compiled in 1904, but changes may have since taken place.

- 40 From a position with the eastern entrance point of the Koepera Poekwa bearing 000°, and the western entrance point of the Inaboeka, 038°, in a depth of 4 fathoms (7^m3), a course 033° leads over the bar, which is one mile across, in a depth of less than 2½ fathoms (5^m0). When these points bear 343° and 043°, respectively, alter course to
45 060°, which leads in mid-channel, in depths gradually increasing to 5 fathoms (9^m1). When the above points bear 312° and 009°, respectively, steer 030° through the middle of the entrance, in depths of over 5 fathoms (9^m1). A village lies on the western bank of the river. The maximum rate of the stream is 1½ knots.

- 50 Otakwa rivier flows out about 5 miles east-south-eastward of Inaboeka rivier. (See view facing this page.) The following directions for entering the river were compiled in 1936, but they should be used with caution, as it is possible that changes in the sandbank and bar may have since taken place.

Chart 2759a.

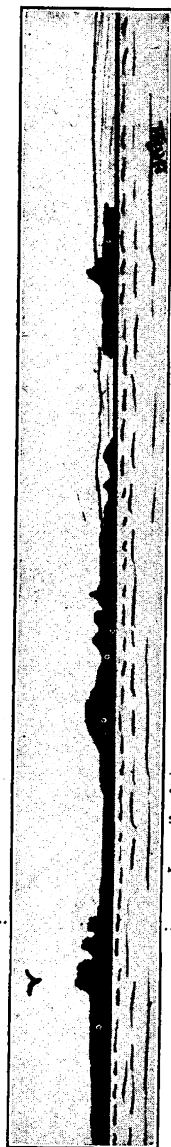
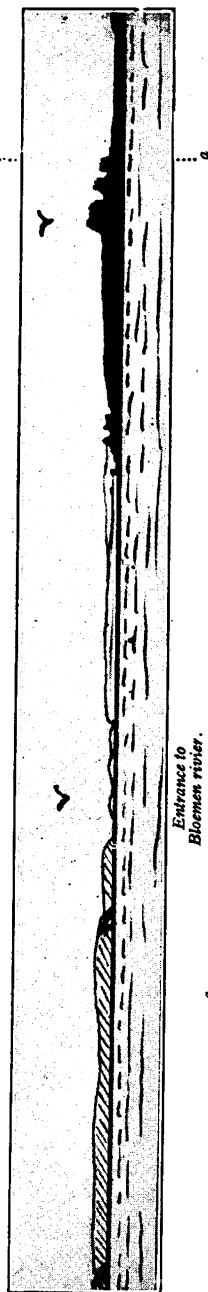
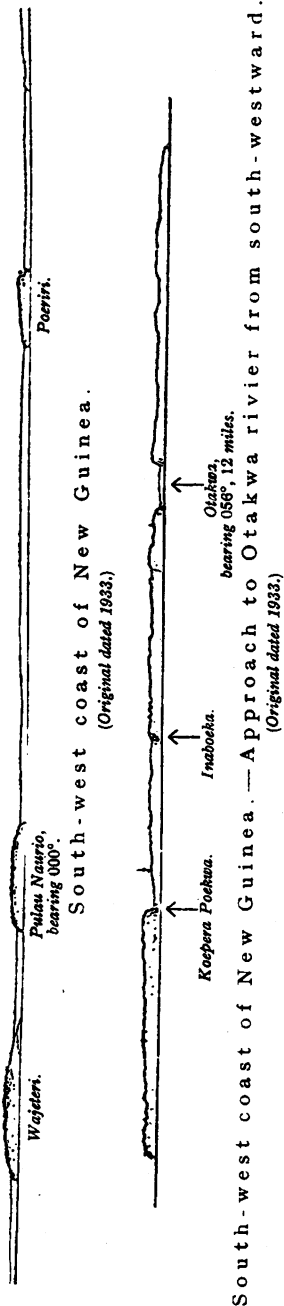


Chart 942b.

To enter the river steer for the eastern entrance point of Inaboeka rivier, bearing 003° , until the western entrance point of the Otakwa bears about 045° , when steer for it on that bearing. When the sandbank, covered with vegetation, situated about $2\frac{1}{2}$ miles southward of this point, bears 120° , steer for the high clump of trees standing on the eastern entrance point (*Lat. $5^{\circ} 00' S.$, Long. $137^{\circ} 13' E.$*), bearing 063° , until the sandbank, mentioned above, bears 195° , when steer 032° , which leads into the river, close to the western entrance point. During the strength of the South-east monsoon, the bar is impassable. The river is difficult to navigate and is only available for a short distance. There is a settlement at the mouth of the river.

There are several rivers between the Otakwa and the Kasteel, 35 miles south-eastward, the principal of which are the Ipoekwa, Amboekerah, Akimeugah, Groot Moeras (Great Muras) and Torpedoboot rivieren, all of which connect with one another. The Ipoekwa, Akimeugah and Torpedoboot rivieren are only navigable a short distance. The Amboekerah, which is about $2\frac{1}{2}$ cables wide at its mouth, with a depth of 23 feet (7^m0), has been ascended for a distance of about 20 miles, where its width is about a quarter of a cable, and its depth 11 feet (3^m4).

Kasteel rivier, off the entrance to which is the island of the same name, may be identified by three conspicuous trees on the western side of the entrance. Kasteel eiland is lower in the middle than at the ends, and resembles a castle with battlements; it is connected to the coast by a mudbank which dries. A channel, with a depth of 10 feet (3^m0), leads into the river. A short distance inside the entrance the river divides into two branches, the eastern of which connects with the Bloemen rivier. The western branch is navigable a considerable distance.

The channel leading to the Bloemen rivier, which is entered about 7 miles south-eastward of the Kasteel, passes north-westward of Laag eiland; the river is navigable by vessels with local knowledge, with a draught of 11 feet (3^m4), for a distance of about 30 miles, where it is connected with Le Cocq d'Armandville rivier by a channel navigable by boats with a draught of 6 feet (1^m8). (See view facing page 238). A steamboat can proceed a further 15 miles up river. There is a least depth of 8 feet (2^m4) on the bar at the mouth of Le Cocq d'Armandville; this river is seldom navigable by a vessel with a draught of as much as 12 feet (3^m7).

Laag eiland, about 5 miles south-south-westward of the entrance to Bloemen rivier, is low and covered with vegetation. Klein eilandje (*Lat. $5^{\circ} 23' S.$, Long. $137^{\circ} 46' E.$*) lies about 4 miles eastward of Laag eiland and one mile offshore.

Hellwig rivier, which flows out about 8 miles south-eastward of Bloemen rivier, is nearly half a mile wide at its mouth, and is approached through a channel with a depth of 16 feet (4^m9). It is navigable by a vessel with local knowledge, with a draught of $11\frac{1}{2}$ feet (3^m6), for a distance of about 30 miles, where the width is about 80 yards (73^m2), and there divides into two branches, the western of which is accessible to a steamboat for a distance of about 6 miles; the eastern branch connects with Noordwest rivier. The vicinity of the river is well populated, and the inhabitants are friendly.

Off-lying danger.—De Jong's banken, with a depth of 8 feet

Chart 2759a.

Chart 942b.

(2^m4), hard sand, lies about 19 miles westward of Kasteel eiland (*Lat.* 5° 16' S., *Long.* 137° 38' E.), and about 10 miles offshore.

Chart 2759a.

- 5 **Flamingo baai.**—**Off-lying danger.**—This bay, entered about 10 miles south-eastward of Hellwig rivier, receives the waters from the rivers Noordwest, Lorentz, and Oetoemboewe.

Noordwest rivier is about 7 cables wide at its mouth, but inside decreases rapidly to about 80 yards (73^m2); it is navigable by a vessel
10 with local knowledge, 164 feet (50^m0) in length, and a draught of 11½ feet (3^m6), for about 8 hours steaming.

In the upper part the river divides at each of three places into two arms, the last division joining again higher up. When the river is at its normal height from the middle of October to the middle of April,
15 the so-called little rainy season, a steamboat can reach the third point of division in two days, whence the mountains can be reached in three days by canoe. When the water is low a steamboat can only ascend as far as the first bifurcation.

Noordwest rivier is connected with the Hellwig by a navigable
20 branch. There are several villages on the river, the inhabitants of which are friendly.

Lorentz rivier is navigable by vessels of 11½ feet (3^m6) draught, and 164 feet (50^m0) in length, to just below the Dumas rivier, a tributary which joins the main stream in about lat. 5° 03' S. A steamboat
25 can ascend as far as 4° 47' S., and a canoe to 4° 40' S. From this point the Lorentz expedition, in 1909, after a trip of 25 days, reached Wilhelmina Top (page 236), 24 miles northward. The natives along the banks of this river were friendly.

Oetoemboewe rivier is navigable for about 50 miles by a vessel with
30 local knowledge with a draught of about 12 feet (3^m7), and a length of 164 feet (50^m0), and beyond this by a steamboat for 20 miles farther. A wide tributary on the right bank is navigable by a steamboat for 19 miles.

Providentiaal bank, with a depth of 2½ fathoms (4^m1) near its
35 western extremity, extends about 13 miles westward from the south-eastern entrance point of Flamingo baai.

A vessel approaching Flamingo baai should keep in depths of over 6½ fathoms (11^m9) until the eastern bank of Lorentz rivier bears 031°, when she should steer for it on that bearing, passing south-eastward of
40 a 2½-fathom (5^m0) patch, situated about 17 miles south-south-westward of the north-western entrance point of the bay.

Flamingo baai to Kaap Valsch.—**Coast.**—The extensive bight between Flamingo baai and Kaap Valsch, about 170 miles southward, is occupied by a mudbank, with depths of from 3½ to 10 fathoms (6^m4
45 to 18^m3). The mouths of the rivers do not afford any landmarks except close offshore.

Eilanden rivier.—This river has two mouths, the north-western of which is entered about 8 miles southward of Flamingo baai. (*See*
view facing this page.) The southern entrance is navigable by vessels
50 with local knowledge with a draught of about 12 feet (3^m7) as far as lat. 5° 21' S., long. 139° 20' E. under favourable conditions. A vessel should approach this entrance with the southern entrance point, on which there is a wood, bearing 093°, which leads just clear of the bank, which dries, north-eastward of Triton bank (*see* page 241); the wood,

To face page 240.

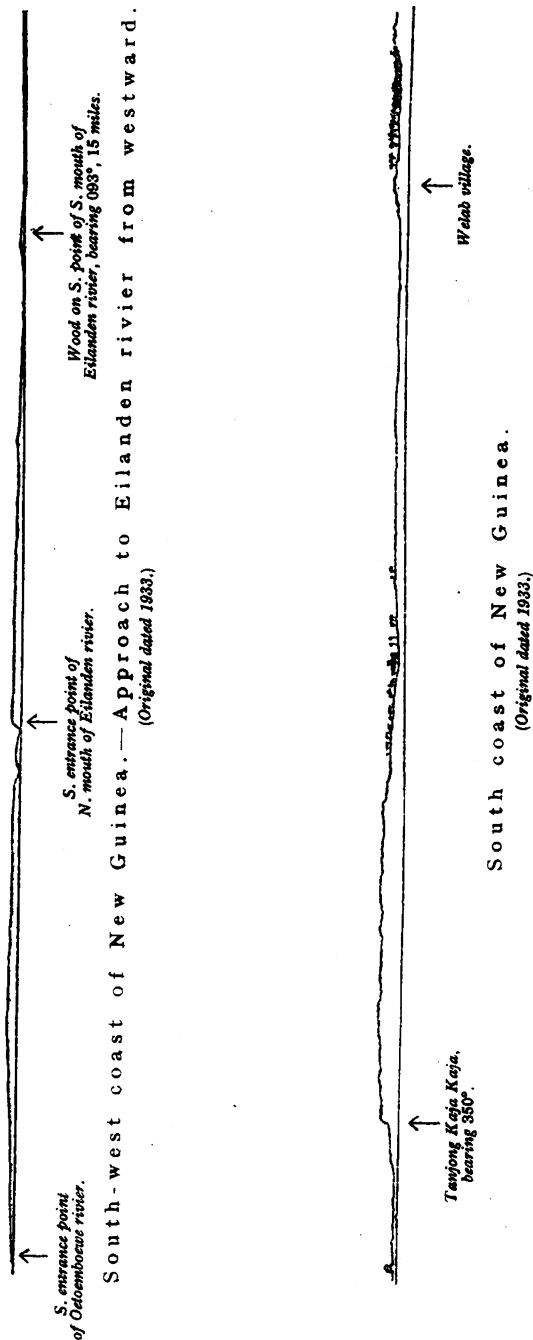


Chart 2759a.

however, is difficult to distinguish until a depth of 16 feet (4^m9) is obtained; the southern entrance point of the northern entrance is a useful mark until then. A depth of 15 feet (4^m6) can be carried through the channel over the bank to the southern entrance. 5

To enter by the northern entrance, a vessel should cross the outer bank by steering for the conspicuous southern entrance point (*Lat.* 5° 54' S., *Long.* 138° 15' E.); there is a depth of only 5 feet (1^m5) on this bank, and there is a similar depth above the first island above the delta. The upper reach of the northern arm is difficult to navigate 10 owing to the numerous islands. The northern arm, about 20 miles within its entrance, is connected to the Oetoemboewe rivier by Anna rivier, which is navigable by praus.

In 1925, it was found by the Netherlands Government steamer *Fomalhaut* that the left bank of the southern arm above the delta could 15 be held as far as its junction with the Kampoeng rivier, passing westward of the first island and northward of the second one. An islet in *lat.* 5° 31' S., *long.* 139° 06' E. should be passed on the northern side.

In approaching the northern mouth of the river, the yacht *Rosaura* 20 reported, in 1935, that, from a position about 6 miles west-southwestward of the entrance, she steered for it, bearing 064°, which led, in a least depth of 3½ fathoms (6^m4), to the entrance, within which she obtained depths of from 4 to 5 fathoms (7^m3 to 9^m1): the entrance should not, however, be attempted without local knowledge. 25

Vriendschaps rivier, which is the first large tributary flowing into the right bank of Eilanden rivier, is navigable by a vessel with local knowledge, with a draught of 11½ feet (3^m6) for about 6 hours steaming, that is, to the position where the first tributary flows into the right 30 bank.

Brazza rivier and Kolff rivier, which flow into the Eilanden rivier, are navigable by vessels with local knowledge with a draught of 11½ feet (3^m6), the former as far as *lat.* 4° 47' S., *long.* 139° 29' E., and the latter for a distance of about 40 miles.

Dojiaissi rivier, the first tributary flowing into the left bank of 35 the southern arm, about 8 miles within its entrance, is about 1½ cables wide at its mouth, narrowing quickly to about three-quarters of a cable. It has been explored by a steamboat as far as *lat.* 6° 00' S., *long.* 138° 44' E., where the width is only about 50 feet (15^m2), the depth throughout being 17 feet (5^m2); the in-going and out-going streams are felt 40 over the whole course of the river. The densely populated village of Biroefoe stands near the mouth of the Dojiaissi.

Kampoeng rivier, the second tributary which flows into the left bank of the southern arm of the Eilanden rivier, about 5 miles northward of the Dojiaissi, was easily identified by the Government steamer 45 *Fomalhaut*, in 1925, and sufficient depths were found although the river was not in flood. The channel is somewhat indicated by the stream and the type of vegetation; the water was very muddy.

Wildeman rivier, the first tributary flowing into the left bank of the Eilanden rivier above the delta, has marshy banks with a heavy outlet, 50 but fairly clear water. A vessel with local knowledge with a draught of 6 feet (1^m8) can ascend to *lat.* 5° 23' S., *long.* 139° 32' E. About 30 miles from the entrance, the river divided into two branches.

Off-lying dangers.—Triton bank (*Lat.* 5° 59' S., *Long.* 138° 04' E.)

Chart 780.

Chart 2759a.

is the outermost sandbank, which dries, lying within 13 miles of the southern entrance of the Eilanden rivier.

Tidal streams.—Over the off-lying banks the tidal stream sets
5 between north and north-north-east with the rising tide, and between south and south-south-west with the falling tide.

Coast.—Between Eilanden rivier and Digoel rivier (*see below*), several unimportant rivers flow out, the two principal of which are Kronkel and Cook, situated about 22 and 29 miles, respectively, south-
10 ward of the southern entrance of Eilanden rivier. Birab village stands on the northern bank of Kronkel rivier. Cook rivier flows into the head of an inlet, on the south-eastern side of which there is a large village. There is a depth of 8 feet (2^m4) in the entrance of Kronkel rivier, and 4 feet (1^m2) in that of Cook rivier.

15 **Digoel rivier.**—This river rises in the Sneeuw gebergte, near the boundary of Netherlands and British New Guinea. About 55 miles eastward of De Jong's punt, situated 65 miles south-south-eastward of the southern entrance of Eilanden rivier, the Digoel divides into two parts, of which the northern delta arm is named Kawarga as far as its
20 junction with its tributary Mappi, about 40 miles within De Jong's punt, whence it is known as the Odammoen; it flows into the sea northward of De Jong's punt through three mouths, named from northward, Maboer, Majoe and Viarre. The southern delta arm bears the name of the main river and flows out between De Jong's punt and
25 Modderhoek, about 21 miles south-south-eastward.

The coast in the vicinity of the delta is low, muddy, and covered with jungle, which is flooded at high water, and consequently there are few landmarks. De Jong's punt and Modderhoek cannot be distinguished
30 at a distance seaward. The only conspicuous mark is a sandy beach, about 2½ cables long, near De John's punt (*Lat.* 6° 55' S., *Long.* 138° 34' E.), where the coast trends south-eastward.

Both the out-going and in-going tidal streams may be strong. At or near spring tides, with the first rise after low water, a flood
35 wave, 5 feet (1^m5) high, flows into the Odammoen rivier. This wave, which appears as breakers, may be dangerous for small vessels.

The Odammoen is navigable at mean level by a vessel with local knowledge, with a draught of 11½ feet (3^m6), through one of its mouths, to the Digoel rivier. Mappi rivier is navigable by a similar vessel to
40 approximately lat. 6° 16' S., long. 139° 51' E.; above this it is only navigable by river craft. A vessel, with a draught of 6 feet (1^m8), can proceed one day's journey higher up, but beyond that the river, although apparently having sufficient depths, is too rapid. The district appears to be densely populated. There is very little current in the
45 river.

The southern delta arm, which is usually used, is approached through two channels through the banks in the mouth; one of these is along the northern shore, but is not navigable as it is encumbered with rocks which dry, and the streams are strong, with many whirlpools. The
50 other one is the main channel, along the southern shore between Modderhoek and Zondags hoek, about 14 miles eastward, with a depth on the bar of about 6½ feet (2^m0).

The main river is navigable by vessels with local knowledge, with a draught of 11½ feet (3^m6), and a length of 164 feet (50^m0). The

Chart 2759a.

principal tributaries of the Digoel are the Ederah, Keebke riki, Kia, Oewamba and Oewimmerah.

The Ederah, which flows into the right bank of the Digoel, was ascended by the Netherlands Government vessel *Anna*, with a length of 82 feet (25^m0) and a draught of 6 feet (1^m8), for a distance of 40 miles. Its entrance is from about 160 to 200 feet (48^m8 to 61^m0) wide, with a least depth of about 5 fathoms (9^m1). At the position reached by the *Anna* the river was still about 80 feet (24^m4) wide. The current in the river is weak.

Oewamba rivier is important to navigation on account of the Government settlement at Tanah Merah, about 50 miles above the junction of the Oewamba and Oewimmerah rivieren, which lies 188 miles above Modderhoek (*Lat.* 7° 12' S., *Long.* 138° 42' E.). It is navigable by vessels with local knowledge with a length of 82 feet (25^m0) and a draught of 6½ feet (2^m0) for 330 miles from its mouth, that is, to about lat. 5° 20' S., long. 140° 27' E., where it is about 300 yards (274^m3) wide, with a depth of from 10 to 11 feet (3^m0 to 3^m4). In lat. 5° 45' S., long. 140° 14' E. the river is about half a cable wide with a depth of 30 feet (9^m1).

The Mandobbe, a tributary of the Oewamba, is about 100 feet (30^m5) wide at its entrance, with a depth of 30 feet (9^m1), and flows through a well populated district, but is much encumbered by obstructions.

Oewimmerah rivier has been navigated for a distance of about 50 miles by a vessel with a length of 164 feet (50^m0) and a draught of 11½ feet (3^m6). The sharp bends, however, make navigation difficult. The Government vessel *Anna* has ascended to lat. 5° 29' S., long. 140° 44' E. The river is about half a cable wide at its junction with the Digoel, about 90 yards (82^m3) wide at its junction with the Inggivakke, and about one day's steaming above, this tributary is about 70 yards (64^m0) wide, with a least depth of 23 feet (7^m0).

In the lower reaches of the Oewimmerah the banks are alternately high and low, and covered with forest; higher up they gradually become hilly and are steep in places. The inhabitants in the district are friendly, and in the upper reaches are numerous.

The Inggivakke, the principal tributary of the Oewimmerah, and flowing into its left bank, is about 100 feet (30^m5) wide, with a depth of 30 feet (9^m1).

Tidal streams.—The in-going tidal stream is strongest in the channel along the northern bank in the entrance to the southern delta arm of the Digoel, and the out-going stream is strongest in the channel along the southern bank. In the latter the maximum rate of the out-going stream was observed to be from 5 to 6 knots for some hours, and about 3 knots on the in-going stream, six days after full moon.

Between Modderhoek (*Lat.* 7° 12' S., *Long.* 138° 42' E.) and Schultzhoeck, situated on the northern bank, about 25 miles eastward, the streams changed 1½ hours after high and low water; on the outer bar the interval was less. In the channel along the northern bank, on the days between full moon and 4 days after, the in-going stream attained a rate of from 5 to 6 knots for several hours, and 2 days after full moon, about 3 hours after low water, it attained a rate of 7½ knots, whilst the maximum rate of the out-going stream was only 3 knots. The in-going stream was observed to extend as far as the junction of the Oewamba and Oewimmerah.

Chart 2759a.

Directions.—A vessel approaching from north-westward should be careful not to mistake one of the mouths of the Odammoen for the Digoel, and should steer for a position with De Jong's punt bearing 5 011°, distant 8 miles, where there is a depth of 26 feet (7^m9), and thence steer 125° to a position about 1½ miles northward of Modderhoek, from which a small conspicuous wood about three-quarters of a mile west-north-westward of Gemeene hoek, situated on the northern bank of the river, about 10½ miles east-north-eastward of Modderhoek, bears 083° ; 10 thence she should steer for Zondags hoek, bearing 096°, taking care to avoid the shoal, with a least depth of 7 feet (2^m1), north-eastward of Modderhoek, until Gemeene hoek bears 040° ; thence she should steer 080° until a beacon 1½ miles eastward of Gemeene hoek bears 046°. Thence she should follow the channel, passing northward of the 15 islet Habee Amman, southward of Habee Sillam, and westward of Ora Sillam, situated about 17, 28 and 34 miles, respectively, above Modderhoek (*Lat.* 7° 12' S., *Long.* 138° 42' E.).

A vessel should not attempt to enter when there is a thick haze or fog bank hanging over the lower reaches of the river, as frequently 20 occurs during the morning.

Outlying bank.—Kolff bank, about 100 miles westward of De Jong's punt, is a sandbank with a depth of 8 fathoms (14^m6), with 19 fathoms (34^m7), mud around it.

Frederik Hendrik eiland.—This island, separated from the south- 25 western coast of New Guinea by Prinses Marianne straat, is low, covered with dense forest and so marshy as to be almost inaccessible. The western side of the island is fringed by a mudbank with depths of from 2½ to 3½ fathoms (5^m0 to 5^m9) extending 25 miles offshore.

Chart 447.

30 Kaap Valsch, the south-western extremity of the island, is dangerous to approach from westward, as, at low water, it is possible to run aground before sighting land. The coastal bank on the southern side of the island is very steep-to, but with ordinary visibility the land should be sighted from that direction in depths of 9 or 10 fathoms 35 (16^m5 to 18^m3) ; the large rise and fall of the tide, however, must be taken into consideration.

Bad weather is usually experienced off Kaap Valsch. With any sea, as there usually is during the East monsoon, and frequently during the West monsoon, it is advisable to keep well away from 40 the coast, as otherwise a vessel will roll heavily. The tidal stream with the rising tide has been observed to set on to Kaap Valsch, and north-eastward and eastward off the north-western and southern sides, respectively, of the island, at a rate of 1½ knots. With the falling tide the stream sets in a contrary direction, at a rate of one knot.

45 Charts 447, 2759a.

Prinses Marianne straat.—Kaap Kolff, the northern extremity of Frederik Hendrik eiland, has some conspicuous trees on either side of it, but they project little above the adjacent forest. The land on either side of the strait is marshy, muddy, and covered with vegetation, 50 interspersed with occasional open spaces ; there are numerous small creeks on both sides.

Moebke rivier flows out on the eastern side of the northern part of the strait. It is about a quarter of a mile wide at the entrance, with a depth of about 5 fathoms (9^m1) ; 6 miles up it is about three-quarters

Charts 447, 2759a.

of a cable wide, with a depth of 2 fathoms (3^m7), and 12 miles up, it is only about 20 yards (18^m3) wide, with a depth of 3 feet (0^m9).

The southern part of the strait is divided into two channels by Komoran eiland; the western channel is named Bensbach kreek, and the eastern the name of the strait. 5

Tanjong Kombies (*Lat. $8^{\circ} 16' S.$, Long. $138^{\circ} 54' E.$*), the eastern entrance point of the southern end of the strait, is a wooded headland which may be identified, especially from southward, by a large tree, the top of which bends over westward. Kaap Kool (Cape Kōl) is the south-eastern extremity of the marshy island Komoran. 10

Bensbach kreek has not been surveyed.

Tidal streams.—In 1936, during the survey of Prinses Marianne straat, it was observed that between Boe eilandje (Bu islet) and Boembel eiland (Bumbe islet), situated about 28 and 3 miles, respectively, from Tanjong Kombies, the tidal stream set northward from 3 hours before low water to 3 hours after low water, and set southward from 3 hours before high water to 3 hours after high water. The rate of the north-going stream was from $2\frac{1}{4}$ to $3\frac{1}{2}$ knots, and that of the south-going stream from half a knot to $1\frac{1}{2}$ knots. In the southern entrance the streams turned at the times of high and low water; at springs the south-going stream attained a rate of 3 knots and the north-going stream 4 knots. 15 20

Directions.—The following directions for Prinses Marianne straat were compiled during the survey:— 25

From north to south.—The northern part is easy to navigate and appears to be subject to little alteration. A mid-channel course should be steered until off the bight in approximately lat. $7^{\circ} 52' S.$ As soon as the northern shore is open, steer in on it and follow it at a distance of from about one to $1\frac{1}{2}$ cables, and when past Boe eilandje do not steer farther to port until the stretch of the opposite shore is well open. 30

After passing the northern entrance of Bensbach kreek follow the Komoran bank at a distance of about $2\frac{1}{4}$ cables for a distance of 2 miles, then cross over to the opposite shore and follow it at a distance of about $1\frac{1}{2}$ cables until the south-eastern point of Boembel bears 232° , when steer 219° along this point until the point situated about 2 miles northward of Kaap Kool bears 158° , when steer for it on that bearing until Tanjong Kombies bears 072° , when steer 146° until near the point where the direction of the coast on the south-eastern side of Komoran changes from south-south-east to south, when the bar should be crossed steering 106° . 35 40

Off the southern side of Boembel care must be taken with the south-going stream that the vessel is not set on to the extremity of the bank lying southward of this island, and the vessel should, therefore, turn on to the course 219° in good time, before the southern extremities of Boembel come open. 45

On the outer bar the stream sets southward when it is setting out of the southern entrance. When the drying banks southward of Boembel are entirely covered, the depths are 10 feet (3^m0) more than those charted. 50

From south to north.—Kaap Kool (*Lat. $8^{\circ} 24' S.$, Long. $138^{\circ} 53' E.$*) and Pulau Kombies, the latter situated close off Tanjong Kombies, are good marks for fixing the position of a vessel on approaching the southern end of the strait; there is no difficulty in entering. During

Charts 447, 2759a.

the East monsoon it is inadvisable to pass through the strait from south to north on account of the heavy sea over the shoaler parts.

Chart 447.

- 5 **SOUTHERN SIDE OF NEW GUINEA.—Coast.**—The coast between Prinses Marianne straat and the boundary between the Netherlands and British territory, about 135 miles south-eastward, is low, muddy and covered with monotonous vegetation. It is fringed by a mudbank with irregular depths of less than 3 fathoms (5^m5), outside
10 which there are many shoal patches, the positions of which may best be seen on the chart.

Between Tanjong Kombies and Tanjong Kaja Kaja, a steep, wooded headland, about 25 miles east-north-eastward, the coast is swampy, with mangroves behind a wide beach of sand and mud, thence to the
15 entrance to Merauke rivier, about 63 miles east-south-eastward, the coast consists of a low sand ridge behind a wide beach, on which there are some trees; within are fertile plains, which are flooded during the rainy season.

There are several villages on the coast between Tanjong Kombies and
20 Tanjong Kaja Kaja. Close to the entrance to Wamal creek, about 13 miles north-eastward of Tanjong Kombies, there is a tree which is conspicuous from the offing, but on closing the coast it merges with the trees in its vicinity.

There is a depth of about 5 feet (1^m5) in the entrance to Wamal
25 creek, which is very narrow. It is inaccessible during the South-east monsoon. There are no villages on the creek, which is about 6 miles in length. Except with good visibility it is inadvisable for a vessel to proceed into depths of less than 3 fathoms (5^m5) between Wamal creek and the Boelaka (Bulaka) rivier, about 9 miles east-north-eastward.
30 There is a conspicuous isolated grove of coconut trees, in the middle of which there is a large tree, situated near the mouth of Boelaka rivier.

Boelaka rivier is navigable by vessels with local knowledge with a length of 164 feet (50^m0) and a draught of about 11 feet (3^m4), as far as Apong village. About 30 miles above its mouth, in long. $139^\circ 22' E$.
35 the river still has a width of about 90 yards (82^m3), and a depth of about 8 fathoms (14^m6). In 1914, the least depth in the approach to the entrance was 6 feet (1^m8), and just inside on the bar $13\frac{1}{2}$ feet (4^m2), increasing to 6 fathoms (11^m0) inside the river.

There is a conspicuous grove of coconut trees which stands well
40 above the surrounding trees, near Walati village, about 3 miles south-south-eastward of the entrance to the Boelaka rivier.

About $1\frac{1}{2}$ miles north-westward of Tanjong Kaja Kaja there is an isolated grove of trees with scrub on its western and eastern sides, and close eastward of the point is Welab village. See view facing page 240.

45 **Off-lying islet and dangers.**—The depths in the vicinity of Tanjong Kaja Kaja (Lat. $8^\circ 12' S.$, Long. $139^\circ 21' E.$) are very irregular and there are many reefs and shoals, the outermost of which are a patch which dries, about $5\frac{1}{2}$ miles south-south-westward, and a 3-fathom (5^m5) patch about $6\frac{1}{2}$ miles south-south-eastward.

50 Habeeke or Vleermuis eilandje, about $6\frac{1}{2}$ miles east-south-eastward of Tanjong Kaja Kaja, and about $2\frac{1}{2}$ miles offshore, is low but covered with high trees. It is fringed by rocks, and a sandy ledge, with a depth of 2 fathoms (3^m7) near its outer edge, extends about $1\frac{1}{2}$ miles west-

Chart 2759a.

Chart 447.

ward, and forms the southern side of a narrow channel, in which there are depths of from $3\frac{1}{2}$ to 4 fathoms (6^m4 to 7^m3), mud, which extends eastward along the northern side of the island; on the northern side of this channel, reefs, which dry, extend to Tanjong Kaja Kaja (*Lat.* $8^{\circ} 12' S.$, *Long.* $139^{\circ} 21' E.$). There is always smooth water in the channel, so landing is possible at all times on the northern side of the islet, but the channel should be marked before use. 5

Sametinke reef, which dries, lies about $1\frac{1}{2}$ miles south-south-westward of Habeeke eilandje; on it are some reddish-brown rocks, which dry about 8 feet (2^m4). Several patches, with depths of 4 and 5 fathoms (7^m3 and 9^m1), lie within $6\frac{1}{2}$ miles south-eastward of the islet. A reef, which dries, with some large rocks on it, lies about $2\frac{1}{2}$ miles eastward of the islet. Farther eastward, off the mouth of Bian rivier (*see below*), the shoals consist of sand. 15

Anchorage.—Directions.—Good anchorage may be obtained by vessels with local knowledge, in a depth of $3\frac{1}{2}$ fathoms (5^m9), mud, with Habeeke eilandje bearing 079° , distant about $2\frac{1}{2}$ miles. A vessel should approach with the islet bearing 054° , until Tanjong Kaja Kaja bears 315° , when she should steer 000° , which will lead to the anchorage. 20

Wambi village, about 14 miles east-north-eastward of Tanjong Kaja Kaja, may be identified by the abrupt eastern edge of a line of remarkably tall coconut palms, which stand well above their surroundings. The mouth of the Sewa rivier, about 2 miles north-eastward of Wambi, is only visible from south-westward and southward; it is fronted by 25 a bar which dries, extending over half a mile offshore. Koroi rivier, entered about 8 miles farther eastward, is also fronted by a bar which dries, lying over half a mile offshore; at high water the river affords a good refuge haven for boats with a draught of about 3 feet (0^m9); the channel is open when bearing about 344° , but is difficult to identify. 30

About 2 miles westward of the mouth of the Koroi there is a tree, the spreading top of which projects well above the other trees in the vicinity; it can only be distinguished on a northerly bearing. A similar tree stands about 2 miles eastward of the mouth of the river; the top, though less spreading, is higher, and is visible from westward 35 and southward at a distance of 10 miles.

Bian rivier.—Bian rivier is entered about 15 miles eastward of Koroi rivier; its muddy water extends about 10 miles offshore.

In the channel over the bank leading to the mouth the depths are only from 7 to 8 feet (2^m1 to 2^m4); on the south-eastern side of this 40 channel about $4\frac{1}{2}$ miles outside the entrance there is the outer edge of a very steep-to sandbank, which dries. The banks near the mouth are covered with mangroves, and entirely submerge at high water.

There is a conspicuous small grove of trees close to the western entrance point of the river, which, although not projecting high above 45 the trees in its vicinity, can be distinguished at a distance of 14 miles.

A vessel should enter the river with the western entrance point bearing 061° ; if the depths decrease suddenly she should steer a more northerly course immediately; the least depth is found with the small wood westward of the mouth bearing 045° . A conspicuous grove of 50 coconut trees lies 4 miles south-eastward of the entrance.

The river is navigable by vessels with local knowledge of $10\frac{1}{2}$ feet (3^m2) draught, as far as Kabtel village in *lat.* $7^{\circ} 42' S.$, *long.* $140^{\circ} 03' E.$; farther up, it narrows rapidly. Great attention should be paid to drift-

Chart 447.

ing timber and the tidal streams. There is practically no slack water, and, when the out-going stream is still running in the outer bend, the in-going stream may be flowing at a considerable rate into the inner bend; on one occasion the river rose 8 feet (2^m4) in 10 minutes, a rushing sound being heard.

Coast.—About 2½ miles southward of the eastern entrance point of Bian rivier is Papis Doemandé village, close to which there is a hillock with a double summit, northward of which the trees on the coast become taller, and at the mouth of the Bian rivier, are very conspicuous. Another grove of trees is situated close south-eastward of Sam Doemandé village, about 2 miles south-south-eastward of Papis Doemandé; this grove has the form of a shoe, with the toe pointing seaward, and is visible about 13 miles offshore.

About 5 miles farther south-eastward is a coconut grove which shows well above the surrounding trees and is visible about 13 miles offshore, and 3 miles farther south-eastward there is a conspicuous grove near the coast, consisting of two remarkable coconut trees separated by a belt covered only with scrub.

Ongari, Kaiboese and Koembe (Kumbe) villages, situated 12, 16, and 18 miles, respectively, south-eastward of Sam Doemandé, and the mouth of the Koembe rivier are not easy to identify at a distance, but there is a large conspicuous banyan tree with a pointed top, standing close southward of the mouth of the river, and is visible at a considerable distance. Care must be taken, however, not to mistake the conspicuous rise of the edge of the forest farther southward for this tree.

Koembe rivier.—Koembe (Kumbe) rivier, entered about 23 miles south-eastward of Bian rivier, is only accessible to small vessels with local knowledge, as the channel through the coastal bank is shallow and narrow. Both banks at the entrance are overgrown with coconut trees, between which and the river is a wide sandy beach. Banks, which dry, extend about 2 miles from both entrance points, and shoal patches lie farther seaward. A 2-fathom (3^m7) patch lies about 9 miles south-westward of the southern entrance point and a 2½-fathom (5^m0) patch lies about 6 miles south-south-westward.

In 1903, the approach channel trended north-eastward with a least width of about a quarter of a cable, and a depth of 16 feet (4^m9) at high water springs. At the entrance (*Lat.* 8° 22' S., *Long.* 140° 13' E.) the river is about 1½ cables wide with depths increasing to 30 feet (9^m1). For the first 20 miles up the width varies from about half a cable to one cable, with depths in the middle of from 23 to 30 feet (7^m0 to 9^m1), except in a few places, such as the very sharp bend just within the entrance, where the depth is about 14 feet (4^m3).

The banks are low and in its lower part, covered with mangroves; higher up the timber becomes heavier, interspersed with coconut trees and bamboo, and in places there are plains overgrown with tall reeds.

Caution is necessary in proceeding through the narrow approach channel, as the current often sets across it at a rate of 2 knots, and there are no marks along the coast on which to steer. During the South-east monsoon the in-going tidal stream at the mouth of the river has a rate of about 1½ knots, and the out-going stream from 2 to 3 knots; during the North-west monsoon these rates are greater. As the river is ascended these rates diminish, but the in-going stream is still felt up to Wayo village, about 30 miles from the mouth in a direct

Chart 447.

line. In 1903, a steam launch proceeded up the river for about 165 miles to a point where it was only about 30 feet (9^m1) wide.

Merauke reede.—Lights.—Beacons.—Buoys.—This roadstead is situated in the Merauke rivier, which flows out about 10 miles south-eastward of the entrance to Koembe rivier. A wide bank, which dries, extends about 2 miles from both sides of the entrance; through this bank there is a buoyed channel, with a least depth of 4 feet (1^m2), trending first eastward and then north-eastward, to the mouth of the river. 5

Two shoals, each with a depth of 2 fathoms (3^m7), lie about 13 miles westward and west-south-westward, respectively, of Tanjong Haram, the eastern entrance point of the river. Breakers were reported, in 1919, about 8 miles south-westward of the same point. 10

A light is exhibited, at an elevation of 75 feet (22^m9), from a white iron framework structure, 65 feet (19^m8) in height, about 1½ miles south-south-eastward of Tanjong Haram. 15

A light is exhibited from the head of the pier at Merauke.

A conical buoy, painted in red and black bands, surmounted by a ball, is moored about 6½ miles westward of the light structure, and indicates the approach to the channel through the bank. The channel is marked by a black can buoy on its north-western side, and by two white conical buoys on its south-eastern side. 20

Two leading beacons, consisting of rectangular framework structures, are situated on the northern side of the entrance to the river about 1½ miles northward of Tanjong Haram; the front beacon is 13 feet (4^m0) in height, and the rear beacon, north-eastward of it, which is surmounted by a triangle, is 16 feet (4^m9) in height. 25

Tidal streams.—From the middle of March to the middle of April the out-going stream was observed to flow for about 7 hours by the mouth of the river, at a rate of 2 knots, and the in-going stream for about 5 hours, at a rate of one knot. During November and December the stream runs in the direction of the coast, setting north-westward for about 7 hours and south-eastward for about 5 hours. The in-going stream is felt for about 60 miles up the river. Off the pier at Merauke the stream sometimes attains a rate of 5 knots. 30 35

Anchorage.—Directions.—Anchorage may be obtained by vessels with local knowledge, in a depth of about 24 feet (7^m3), in the middle of the river, northward of the Administrator's house, where it is about a quarter of a mile wide; it is advisable to moor. 40

If anchoring off the coal sheds care must be taken to allow room to swing well clear of the pier. The coastal bank extends for some distance from Tanjong Sewa (*Lat.* 8° 27' S., *Long.* 140° 22' E.), a prominent projection on the opposite side of the river.

A vessel approaching from westward should sound continuously when nearing Frederik Hendrik eiland and until well past Kaap Kool; thence when nearing Merauke and if too close inshore, some of the conspicuous groves of trees on the coast may be distinguished. She should steer for the lighthouse, which is not easily seen owing to the dark background, bearing 090°, which will lead close to the outer approach buoy; thence she should steer to pass southward of the black can buoy, and then keep the leading beacons in line, bearing 044°, which will lead to the outer white buoy; thence she should pass northward of both white buoys, keeping well over to the northern side of the river, as the 45 50

Chart 447.

bank from the southern shore extends northward of the line joining these two buoys. After passing the inner white buoy she should steer for the head of the pier, or, if at night, for the light thereon, bearing
 5 121°.

Merauke rivier.—This river is navigable by vessels of a length of about 200 feet (61^m0), and with a draught of 10½ feet (3^m2), for a distance of 60 miles, and by boat for 150 miles. There are three bars in the lower reaches of the river above the town, with a least depth of
 10 11 feet (3^m4); elsewhere there is a general depth of about 30 feet (9^m1). For about 30 miles from the mouth the jungle becomes thicker and the width of the river gradually decreases.

The limits of the roadstead are an imaginary line drawn 330° from the light structure, and an imaginary line drawn 045° from the right
 15 bank of the river at the mouth of the Sewa creek, situated about half a mile north-westward of Tanjong Sewa (*Lat.* 8° 27' S., *Long* 140° 22' E.).

Merauke.—This town, the capital of Netherlands New Guinea, stands on a low plain enclosed by forest, on the southern side of the
 20 river, about 1½ miles eastward of Tanjong Haram; it is protected from flooding by a dike on the river side.

Provisions are fairly plentiful.

Rainfall.—*See* page 25.

Coast.—Between Merauke and the eastern boundary of Netherlands
 25 New Guinea, about 55 miles south-eastward, the coast presents an extraordinarily uniform appearance, and is fringed by a bank, with depths of less than 3 fathoms (5^m5), extending about 8 miles offshore.

For description of Bensbach river and the coast eastward, *see* Australia Pilot, Vol. III.

Chart 2759a.

APPENDIX I LIST OF PRINCIPAL PORTS, showing particulars of depths, etc.

PORT	Depth below Chart datum level		Rise of tide.		REMARKS
	In channel of approach. Fathoms.	In anchorage. Fathoms.	Springs. Feet.	Neaps. Feet.	
Tahoena baai ; Sangi	Deep	19 to 30	6-5	4-5	23 feet at head of Hertog Hendrick pier
Menado ; Celebes	Deep	10 to 30	6-0	4-0	
Talisei ; Celebes	Deep	10 .	7-0	4-5	
Kema ; Celebes	Deep	5 to 11	4-0	2-7	
Ternate	Deep	15	4-0	2-5	
Laboeha ; Halmahera	Deep	7 to 9	—	—	
Boeli ; Halmahera	Deep	5	5-0	4-0	
Baai van Sanana ; Soela eilanden	8	8	—	—	
Baai van Kajeli ; Boeroe	Deep	19 to 22	4-5	—	
Baai van Wahai ; Ceram	Deep	22 to 27	3-5	—	
Baai van Amahai ; Ceram	Deep	6 to 16	—	—	33 feet alongside main wharf 23 feet alongside coaling wharf * Eastern approach 26 feet in western approach
Ambon	Deep	25	5-7	4-7	
Reede Saparoea ; Ambon eilanden	Deep	10 to 12	6-0	—	
Reede Naira ; Banda eilanden	Deep*	6 to 10	6-7	5-3	
Reede Toetal ; Kai eilanden	Deep	11 to 13	5-3	3-8	
Baai van Elat ; Kai eilanden	Deep	14	—	—	
Dobo ; Aroe eilanden	6	7 to 16	7-0	5-7	
Telok Solat ; Sermata eilanden	Deep	27	7-0	—	
Reede Saumlaki ; Tanimbar eilanden	Deep	10 to 16	—	—	
Reede Ritabel ; Tanimbar eilanden	Deep	6 to 11	—	—	
Saonek ; Waigeo	Deep	16	—	—	33 feet alongside main wharf 23 feet alongside coaling wharf * Eastern approach 26 feet in western approach
Samate ; New Guinea	Deep	6½	6-0	4-0	
Fak Fak ; New Guinea	Deep	25	5-0	4-0	
Etna baai ; New Guinea	4	6 to 10	8-5	3-7	
Merauke ; New Guinea	4 feet	4	15-8	7-0	
				13-0	

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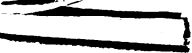
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Gt. Brit. Hydrographic Office.

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SUPPLEMENT No. 7—1955

RELATING TO THE

Eastern Archipelago Pilot

VOL. III

FOURTH EDITION, 1943

CORRECTED TO 4th February, 1955

**Whenever reference is made to the Pilot,
this Supplement must be consulted**

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This Supplement has been compiled by Commander C. R. Brent, R.N., from information received in the Hydrographic Department of the Admiralty since the publication, in 1943, of the fourth edition of the Eastern Archipelago Pilot, Vol. III.

This Supplement should be retained intact for reference; its existence is to be noted on the tabular form inside the cover of the Pilot.

Whenever reference is made to the Pilot, this Supplement must be consulted.

Attention is called to the portions which differ from the *previous Supplement*, which are indicated in the following manner:—

Additions and alterations are enclosed by broad square brackets in heavy type.

Deletions are indicated by a heavy horizontal line.

Supplement No. 6, 1953 is hereby cancelled and all information affecting the Eastern Archipelago Pilot, Vol. III, contained in Notices to Mariners, up to and including No. 296 of 1955, has been embodied in this Supplement; for temporary and preliminary Notices to Mariners affecting this edition, the list of temporary and preliminary Notices to Mariners in force, published monthly in the complete weekly edition of the Admiralty Notices to Mariners, should be consulted.

A. DAY,

Vice-Admiral,

Hydrographer of the Navy.

Hydrographic Department,

Admiralty, London,

4th February, 1955.

SUPPLEMENT No. 7, 1955

relating to the

Eastern Archipelago Pilot

VOL. III

FOURTH EDITION, 1943

(Corrected to 4th February, 1955.)

Front fly-leaf.—Section (2), line 7: *After* “ vessel ” *insert* “ , Traffic Control vessel ”

After Section (3) *insert*:—

Vessels are particularly warned not to enter a declared “ *Dangerous area* ” or approach boom defences without permission, nor to anchor or remain stopped in a dangerous area or prohibited anchorage unless specially instructed so to do.

Section (4), line 2: *After* “ examine ” *insert* “ individual ” and *for* “ abroad ” *read* “ abroad and to control traffic generally. This is the function of the Examination service. Where Traffic Control vessels take the place of Examination vessels their authority is the same.”

Section (7), line 1: *After* “ vessel ” *insert* “ or Traffic Control vessel ”

Line 4: *After* “ vessel ” *insert* “ or Traffic Control vessel ”

Section (9), line 3: *After* “ vessel ” *insert* “ or Traffic Control vessel ”

Page facing the front fly-leaf.—CAUTION at the foot of the page.—Line 2: *For* “ 1, 4 and 7 ” *read* “ 1 to [20] ”

Title page.—*Delete* “ ALL BEARINGS ARE TRUE ”

Page to face page ii].—First paragraph, line 1: *For* “ ALL TRUE ” *read* “ REFERRED TO THE TRUE COMPASS ”

Fourth paragraph, line 1: *For* “ NAUTICAL MILES ” *read* “ SEA-MILES ”

Fifth paragraph.—Line 1: *After* “ EQUAL TO ” *insert* “ ONE TENTH OF A SEA-MILE. IT IS OFTEN ACCEPTED AS BEING ”

Tenth paragraph.—Line 1: *For* “ STEAM ” *read* “ POWER ”

Page iii.—Third paragraph, line 2: *For* “ from the Dutch publications ” *read* “ received in the Hydrographic department ”

Fourth paragraph, line 4: *For* “ nautical miles ” *read* “ sea-miles ”

Sixth paragraph: Lines 2-3: *Delete* “ Admiralty ” to “ agents ” and *substitute*:—

“ Hydrographic Supplies Establishment, Creechbarrow House, Taunton, Somerset; or from any of the Admiralty Chart Agents ”

Page v.—CHAPTER 1, line 2: For "Netherlands East Indies" read "Oost-Indische Archipel"

Page xi.—Malay-English glossary: *Delete and substitute:—*

Aër, Air, Ajer	Water, stream
Alangan	Bar
Aroes	Current
Bahroe	New
Bandar, Bëndar	Port, trading town
Barat	West, western
Batang air	River
Batoe, Bato	Stone, rock
Bëndar	Port, trading town
Bësar	Large, great
Bëting	Shoal
Bëtoeng	Large
Boekit	Hill, height
Boesoeng	Islet, large sandbank
Dalam, Dalëm	Deep, depth, inside
Danau, Dano	Lake
Darat	Land, the interior
Djalan	Road, way, course
Djambatan	Bridge, gangway, jetty, mole
Djërnh	Clear, pure
Gëloeng	Channel over a bar, or, in a river
Gili	Islet, rock
Goenoeng	Mountain
Goesoeng	Shoal, reef, islet, summit, mountain top
Hitam, Itam	Black, dark
Idjau	Green
Kalër	North, northern
Kampoeng	Village
Karang	Coral, reef
Këring	Dry
Këtjil	Small, little
Kidoel	South, southern
Koela, Koewala	Mouth of a river
Koelon	West, western
Koeta, Kota, Kotó	Fortified town
Kramat	Holy place, shrine
Laboean, Laboehan	Anchorage, harbour
Laoet	Sea; North
Larangan	Prohibited
Lebar	Wide, broad
Lor	North, northern
Mëndara	Minaret, watch-tower
Merah	Red
Moeara, Moeoró	Mouth of a river
Napoe	Reef
Oedjoeng	Point, extremity
Oelak	Eddy, whirlpool
Paja	Marsh, swamp
Pangkalan	Landing place
Pantjang	Pole, stake, pile

Parigi, Përigi	Well, spring
Passanggrahan	Government rest-house
Pasir, Pasie	Sand, sandbank
Pëlaboen	Anchorage
Përhëtian	Rest-house
Përigi, Parigi	Well, spring
Pinggir laoet	Coast, seaboard
Poelau	Island
Poelau-poelau	Group of islands
Poera, Poeri	City, town
Poetih	White
Pontjak	Summit, peak
Praja	Town
Prau	Boat, ship
Ras	Head
Rawa, Rawah	Marshy ground
Rawang	Swamp; Gap
Rëndah	Low
Riam, Rijam	Waterfall, rapid
Rimba, Rimbö	Virgin jungle
Roemah	House
Sawang	Narrows, strait
Sëlat	Strait, channel, narrows
Sëlatan	South, southern
Soember	Spring of water
Soemoer	Well (water)
Soengai, Soengei	River
Taka, Takat	Shoal, reef, rock
Tandjoeng, Tandjong . .	Cape, headland, promontory
Tasik	Lake
Tëlaga, Tëlagö	Pond, well
Tëloek, Tëlok	Bay, bight
Tënanng	Calm, smooth
Tëroesan, Troesan	Connecting channel
Timoer, Timor	East, eastern
Tinggi	High, height, lofty
Tinjau	Look-out
Titian	Mole, jetty, foot-bridge
Tjadi	Little, small
Tjandi	Shrine, monument
Tjetek	Shallow
Toekoeh, Toekoh	Islet
Tokong	Rocky treeless islet, large rock, shrine
Troemboe	Reef which dries
Troesan, Tëroesan	Connecting channel
Utara	North, northern
Wai, Waj	Stream, creek
Wetan	East, eastern

Glossary: Netherlands—English: *For* "Hock" read "Hoek" and *for* "Wert" read "West"

Page xvi.—After the last line insert:—

Note.—Throughout this volume the vowels œ in Indonesian names should be rendered by the letter u. When place names are concerned

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this, in effect, usually makes the alternative or obsolete name (shown in brackets) the correct rendering.

Page xvii.—Above Page heading: *Insert:—*

**LAWS AND REGULATIONS APPERTAINING TO
NAVIGATION**

While, in the interests of the safety of shipping, the Admiralty make every endeavour to include in their hydrographic publications details of the laws and regulations of all countries appertaining to navigation, it must be clearly understood:—

- (a) *that no liability whatever can be accepted for failure to publish details of any particular law or regulation, and*
- (b) *that publication of the details of a law or regulation is solely for the safety and convenience of shipping and implies no recognition of the international validity of the law or regulation.*

[Page xviii.—Line 14: *Delete and substitute:—*

"(ii) Prior to 1954, when a chart was corrected from information which was "

[Line 16: *For "is" read "was"*]

[Lines 18, 27, 28: *For "are" read "were"*]

[Line 24: *For "indicate" read "indicated"*]

[Line 25: *After "respectively" insert ", which would appear on later printings"*]

[Line 29: *For "may" read "might"*]

[Line 32: *For "does" read "did"*]

[After line 32 insert:—

- (iii) Since 1954, in order that more attention may be given to New Editions, Large Corrections and corrections by Notices to Mariners, and for other reasons, the making of minor corrections to Chart plates as in (ii) has been discontinued. Information of no importance to safe and convenient navigation is instead recorded for inclusion in the next New Edition or Large Correction; or, for promulgation in a later Notice to Mariners should a change of circumstance alter the importance of the information.

In consequence the small correction date enclosed in a rectangle does not appear later than 1953 on navigational charts. The date within brackets may still appear and is then an indication that magnetic compasses have been corrected for a change in variation.]

[Lines 37, 39: *For "red" read "violet"*]

[Page xix.—Line 20: *For "red" read "violet"*]

Page xx.—Lines 7 and 10: *For "Wireless" read "Radio"*

Page xxi.—Line 10: *For "parts" read "volumes"*

Line 12: *For "part" read "volume"*

Lines 14-25: *Delete and substitute:—*

The volumes are published annually at the rate of one volume per month commencing with Volume 1 in January and ending with Volume 12 in December. Supplements to these volumes will not be issued.

Page xxi continued.

Each volume will be issued with an inscription on its cover and title page stating the date to which the volume has been corrected, which will be approximately six weeks prior to the date of its issue. Permanent and temporary corrections or additions to each volume which may occur between the date of correction and date of issue, will be promulgated by Section II of Admiralty Notices to Mariners.

Amendments.—Important amendments are promulgated in Admiralty Notices to Mariners. In Section III of each Weekly Complete Edition of the Notices will be found all additions and alterations made to Lights, Fog signals and Visual Time signals by the Notices issued during the week affected; certain other additions and alterations are also included in Section III, which, though not of sufficient importance to necessitate the issue of a Notice to Mariners, will be found of use to the seaman.

Corrections to the Light Lists should be made in pencil, or extracted from Section III and pasted into the appropriate volume.

Line 29: *For " shall " read " should "*

[Line 33: *For " in three volumes " read " as follows:—"*]

[Lines 36-38: *Delete " radio," to " ships " and substitute " radio."*]

[Lines 40-41: *Delete " , together " to " signals)" and substitute " including air radiobeacons useful to ships; also stations giving QTG service and calibration stations "]*

[Lines 44-47: *Delete " (including " to " routes " and substitute " together with the relevant codes*

Volume IV.—Meteorological Observation Stations.

Volume V.—Comprises particulars of Radio time signals, Uniform time system, Navigational warnings and Position fixing systems (Decca, Loran, Consul, etc.)."]

[Lines 49-55: *Delete and substitute:—*

All corrections subsequent to the date of publication are promulgated in Section VI of the complete weekly edition of Admiralty Notices to Mariners.]

Page xxii.—[Lines 1-2: *Delete.*]

[Line 6: *Delete " Supplements " to " the "*]

[Page xxiv.—Line 53: *For " astronomical " read " geographical "*]

[Line 56: *For " an astronomical " read " a geographical "*]

[Page xxv.—Line 9: *For " astronomical " read " geographical "*]

Page xxvi.—Lines 34-35: *Delete " wireless " to " from " and substitute:—*

" radiobeacons situated at "

Line 38: *For " signal on a wireless " read " position on a radio "*

Line 41: *For " these signals " read " the light-vessel "*

Page xxviii.—Line 41: *For " useful " read " usual "*

Page xxix.—*For " wireless " read " radio "*

Page xxx.—*After line 13 insert:—*

Magnetic variation values shown on Admiralty charts are for the 1st July of the year mentioned.

Page xxxii.—Line 42: *For " track " read " path "*

Page xxxiii.—Lines 20-22: *Delete " ; and in order " to " heave to "*

Line 31: *Add*:—It can however be assumed that the storm is not travelling in a southerly direction, if in the northern hemisphere, or in a northerly direction, if in the southern hemisphere; and if in a lower latitude than 15° its path is most unlikely to have an easterly component, except in the South Pacific eastward of the 180th meridian.

Line 35: *For " check of " read " check on "*

After line 52 insert:—

19. Sometimes a tropical storm moves so slowly that a vessel, if ahead of it, can easily outpace it, or, if astern of it, can overtake it.

Since, however, she is unlikely to feel seriously the effects of a storm known to be in the vicinity so long as the barometer does not fall below 1005 millibars, it is recommended that frequent readings should be made and that the vessel should continue on her course until the barometer falls to 1005 millibars or the wind increases to force 6. If and when the first of either of these events occurs, she should act as directed in the preceding paragraphs until the barometer has risen above 1005 millibars and the wind decreased to force 6 or less. Should it be certain, however, that the vessel is behind the storm, or in the navigable semicircle, it will evidently be sufficient to alter course away from the centre.

Line 53: *For " 19 " read " 20 "*

Page xxxiv.—Line 1: *For " 20 " read " 21 "*

Line 5: *For " 21 " read " 22 "*

Line 6: *For " wireless " read " radio "*

Chart Index, facing Page 1: *Insert the following new charts*:—

Chart No. 3239—	between	Lats.	$3^{\circ} 50' \text{ S.}$	and	$7^{\circ} 50' \text{ S.},$
		Longs.	$123^{\circ} 25' \text{ E.}$	„	$129^{\circ} 45' \text{ E.}$
„ „ 3244—	„	Lats.	$6^{\circ} 50' \text{ S.}$	„	$8^{\circ} 38' \text{ S.},$
		Longs.	$124^{\circ} 55' \text{ E.}$	„	$129^{\circ} 15' \text{ E.}$
„ „ 3245—	„	Lats.	$6^{\circ} 20' \text{ S.}$	„	$8^{\circ} 38' \text{ S.},$
		Longs.	$128^{\circ} 30' \text{ E.}$	„	$133^{\circ} 45' \text{ E.}$
„ „ 3246—	„	Lats.	$3^{\circ} 55' \text{ S.}$	„	$8^{\circ} 38' \text{ S.},$
		Longs.	$133^{\circ} 35' \text{ E.}$	„	$136^{\circ} 25' \text{ E.}$
„ „ 3248—	„	Lats.	$1^{\circ} 15' \text{ N.}$	„	$1^{\circ} 35' \text{ S.},$
		Longs.	$129^{\circ} 30' \text{ E.}$	„	$133^{\circ} 45' \text{ E.}$

Lat. $1^{\circ} 45' \text{ N.}$, Long. $125^{\circ} 05' \text{ E.}$ —*Insert " Straat Bangka 930* "*

Lat. $3^{\circ} 30' \text{ N.}$, Long. $124^{\circ} 30' \text{ E.}$ —*For " Taruna & Manganitu B " read " Baai van Takoena & Baai van Manganitoe "*

Lat. $3^{\circ} 40' \text{ N.}$, Long. $126^{\circ} 30' \text{ E.}$ —*For " Sereh B. *2793 " read " Straat Liroeng and Reede Sereh 930* "*

Lat. $3^{\circ} 40' \text{ N.}$, Long. $127^{\circ} 20' \text{ E.}$ —*For " Lirung Rd. 2793* " read " Straat Liroeng & Reede Sereh 930* "*

Lat. $3^{\circ} 50' \text{ N.}$, Long. $127^{\circ} 15' \text{ E.}$ —*For " Salebabu Anch^e. " read " Reede Salebaboe "*

[Lat. $1^{\circ} 00' \text{ S.}$, Long. $132^{\circ} 00' \text{ E.}$ —*Delete " Dorei Hum B. 1416* "*

Lat. $1^{\circ} 00' \text{ S.}$, Long. $131^{\circ} 10' \text{ E.}$ —*Insert " Rede Sorong 1416* "*]

Chart Index continued.

Lat. 3° 45' S., Long. 128° 00' E.—For “Amboina B. & Rd.” read “Baai van Ambon, Reede Ambon & Entrance to Inner Harbour.”

Pink slip facing page 1.—First paragraph, line 3: For “Parts VI & X” read “Volumes 6 & 10”

Last paragraph: Line 1: For “W/T” read “radio”

Page 1.—Heading: For “NETHERLANDS EAST INDIES” read “OOST-INDISCHE ARCHIPEL”

Lines 8-9: Delete “Nederland” to “Viceroy” and substitute “Oost-Indische Archipel is a Lieutenant Governor-General”

Page 2.—[After line 18 insert:—

Because of the unsubdued revolt in Zuidelijke Molukken, the capital of the Molukken archipel was temporarily located outside the province in 1950, and is at Tomohon situated at the north-eastern end of Celebes. A place within the province will be designated at the conclusion of the revolt.]

Line 24: For “Netherlands East Indies” read “Oost-Indische Archipel.”

Page 4.—Line 27: For “across” read “towards”

Page 5.—Lines 48 and 50: For “wireless” read “radio”

[Line 49: For “Signals.” read “Signals, followed by the word DE, sent once, and the call sign of the aircraft in distress, three times.”]

[Line 51: For “Signals.” read “Signals, followed by the call sign, of the aircraft in distress, three times.”]

[Lines 52-53: Delete.]

[**Page 6.**—Line 1: For “4” read “3”]

[Line 2: For “5” read “4”]

[Lines 5-8: Delete and substitute:—

5. A gun or other explosive signal fired at intervals of about one minute.

6. A red pyrotechnic light or a succession of red pyrotechnic lights or a parachute flare showing a red light.]

[Line 12: Delete “firing” to “will” and substitute “making or displaying one or more of the following signals:—

1. Fire a succession of green pyrotechnic lights or”]

[After line 13 insert:—

2. The group XXX by radiotelegraphy, as prescribed in the Admiralty List of Radio Signals, sent three times.

3. The spoken word “Pan” by radiotelephony, as prescribed in the Admiralty List of Radio Signals, three times, followed whenever possible by a message giving further information.]

[Line 28: For “lights.” read “lights, or her landing lights.”]

Safety signals from aircraft.—The following are to be employed when an aircraft wishes to send a message concerning the safety of navigation or a message containing important information relative to meteorological warnings:—

1. The group TTT by radiotelegraphy, as prescribed in the Admiralty List of Radio Signals, sent three times, followed by the word

Page 6 continued.

DE, sent once, and the call sign of the station which emits it, three times.

2. The spoken word "Saycuritay" by radiotelephony, as prescribed in the Admiralty List of Radio Signals, sent three times, followed by the call sign of the aircraft transmitting the signal."

[After line 31 insert:—

Urgent signals from Dutch aircraft.—A Dutch aircraft having an urgent message to communicate to a vessel concerning the safety of another aircraft or vessel will pass the information by any method available. If unable to communicate otherwise, the aircraft will circle at least once over the vessel, fly low across the course of the vessel, close ahead, opening and closing the throttle or changing the pitch of the propeller, and then proceed in the direction of the distressed vessel or aircraft. Should the aircraft wish to indicate that assistance is no longer required she will cross the wake of the vessel, close astern, opening and closing the throttle or changing the propeller pitch. These signals may be repeated.

The vessel should acknowledge such signals by hoisting the answering pendant; flashing a succession of 'T's' in the Morse code; and by altering course. Should she be unable to comply with the request for assistance she should hoist flag 'N' of the International Code of Signals, or flash a succession of 'N's' in the Morse code.】

Page 7.—Heading: *For "NETHERLANDS EAST INDIES" read "OOST-INDISCHE ARCHIPEL"*

After line 26 insert:—

Surveying vessels.—Vessels of the Indonesian Government employed on surveying duties show the signals prescribed in the International Regulations for the Prevention of Collision at Sea for a vessel employed in laying or lifting submarine cables. Vessels showing this signal must be given a wide berth and be passed at moderate speed.

Line 38: *For "NETHERLANDS EAST INDIES" read "OOST-INDISCHE ARCHIPEL"*

Lines 39-40, and elsewhere in the Book: *For "Netherlands East Indies" read "Oost-Indische Archipel"*

Page 8.—Heading: *For "NETHERLANDS EAST INDIES" read "OOST-INDISCHE ARCHIPEL"*

Page 9.—Heading: *For "NETHERLANDS EAST INDIES" read "OOST-INDISCHE ARCHIPEL"*

Page 10.—**[Line 24:** *For "28" read "17"]*

[Line 25: *For "Convention of June 21, 1926" read "Regulations"]*

Lines 31-40: *Delete and substitute:—*

Radio.—The following coastal radio stations in the area covered by this volume are open for public correspondence:—

Ambon (Amboina in List), Menado, and Doom. For details see List published by the General Secretariat of the International Telecommunication Union.

Standard and Summer Times.—All information regarding Standard Times and Summer Times will be found in the Admiralty List of Radio Signals, Vol. V.

Page 11.—*After line 27 insert:—*

Caution.—Cautionary notes appear on many charts calling attention to areas in which there are telegraph cables; these areas are indicated on the charts by pecked lines. Every care should be taken to avoid anchoring in such areas, even though there may be no specific prohibition against doing so, in view of the serious interference with communications which results from damage to submarine cables. Equal care should be taken wherever the symbol for a submarine cable is shown on a chart.

Danger involved in cutting a cable to clear anchors or fishing gear.—In the event of a vessel fouling a submarine cable every effort should be made to clear the anchor or gear by normal methods; should these efforts fail, the anchor or gear should be slipped and abandoned *without attempting to cut the cable. High voltages are, or may be, fed into certain submarine cables; serious risk exists of loss of life due to electric shock, or at least of severe burns, if any attempt to cut the cable is made.*

No claim in respect of injury or damage sustained through such interference with a submarine cable will be entertained.

Compensation for anchors or fishing gear sacrificed in order to avoid injuring a submarine cable can be claimed under the Submarine Telegraph Act of 1885 (Schedule of Submarine Telegraph Convention, Article VII).

FIRING DANGER AREAS.—Firing and bombing practices take place in a great number of areas off the coasts of Great Britain, Northern Ireland and Eire, and the number of areas in the waters of Commonwealth, Dominion, Colonial and Foreign Governments has recently increased.

In view of the responsibility of range authorities for avoiding accidents, limits of practice areas will not be shown on charts and descriptions of areas will not appear in the Sailing Directions. Such range beacons, lights and marking buoys as may be of assistance to the Mariner, or targets which might be a danger to navigation, will, however, be shown on charts and, when appropriate, be mentioned in the Sailing Directions.

Lights will be mentioned in the Admiralty Lists of Lights.

The principal types of practices carried out are:—

(a) *Bombing practice from aircraft.*

Warning signals are usually shown.

(b) *Air to air, and air to sea or ground firing.*

The former is carried out by aircraft at a large white or red sleeve or flag towed by another aircraft moving on a steady course. The latter is carried out from aircraft at towed or stationary targets on sea or land, the firing taking place to seaward in the case of those on land.

As a general rule, warning signals are shown when the targets are stationary, but not when towed targets are used.

(c) *Anti-aircraft firing.*

This may be from anti-aircraft guns or machine guns at a target towed by aircraft as in (b) above, or at balloons or kites. Practice may take place from shore batteries or ships.

Warning signals are as a rule shown from shore batteries but not from ships.

Page 11 continued.

- (d) *Firing from shore batteries or ships at sea at fixed or floating targets.*

Warning signals usually shown as in (c).

- (e) *At remote-controlled craft.*

These craft are 68 feet (20^m7) in length and carry not under control lights, as well as normal navigation lights. Exercises consisting of practice bombing, air to sea firing and rocket firing will be carried out against these craft or targets towed by them.

Warning will be broadcast by radio before this practice is carried out.

Warning signals, when given, usually consist of red flags by day and *red fixed or red flashing* lights at night. The absence of any such signal cannot, however, be accepted as evidence that a practice area does not exist. Warning signals are shown from shortly before practice commences until it ceases.

Caution.—A vessel may be aware of the existence of a practice area from Local Notices to Mariners or similar method of promulgation and by observing the warning signals or the practice.

She should, whenever possible, avoid passing through an area in which a practice is in progress but, if compelled to do so, should endeavour to clear it at the earliest possible moment.

If, during anti-aircraft, air to air, sea or ground firing practice, projectiles or splinters are observed to be falling near a vessel, she should maintain her course and speed and all persons on board should take cover. Every practicable precaution, however, will be taken by the Authority in charge of the practice to avoid the risk of damage from falling shell splinters, bullets, etc., to vessels, and all on board them, within the area.

The foregoing provisions will be applied generally to firing danger areas established, or to be established, in the waters of Commonwealth, Dominion, Colonial and Foreign governments.

Single Ships approaching Squadrons or Aircraft Carriers.—

Caution.—The attention of shipowners and mariners is called to the danger to all concerned which is caused by single vessels approaching a squadron of warships, or merchant vessels in convoy, so closely as to involve risk of collision, or attempting to pass ahead of, or through, such a squadron or convoy. Mariners are therefore warned that single vessels should adopt early measures to keep out of the way of a squadron or convoy.

The fact that it is the duty of a single vessel to keep out of the way of a squadron or convoy does not entitle vessels so sailing in company to proceed without regard to the movements of the single vessel. Vessels sailing in a squadron or convoy should accordingly keep a careful watch on the movements of any single vessel approaching, and should be ready, in case the single vessel does not keep out of the way, to take such action as will best aid to avert collision.

Attention is also drawn to the uncertainty of the movements of aircraft carriers, which must usually turn into the wind when aircraft are taking off or landing. Furthermore, Mariners should realise that at night her Majesty's aircraft carriers, whether engaged on night flying operations or not, may exhibit navigation lights (except the overtaking light) from the island structure only. This structure is always on the starboard side. This, in effect, means that the bow lights do

Page 11 continued.

not indicate the full beam of the ship; the starboard bow light is on the starboard side but the port bow light may be as much as 100 feet (30^m5) from the port side.

Mined Areas.—Vessels navigating in those waters which are “declared danger areas” owing to mines, should keep strictly to the directions contained in NEMEDRI. This publication gives routes through those declared danger areas and all information required for their safe navigation.

For the state of these mined areas the Admiralty Notice to Mariners on the subject of *the latest date* should be consulted.

Fishing in the mined areas is prohibited, and passage through them is highly dangerous; vessels disregarding this warning do so at their peril.

LIFE-SAVING.—Lifeboats and Life-saving appliances form the principal means adopted for saving life.

The line-throwing apparatus, the principal life-saving appliance, can often be used with effect when a lifeboat is not available; its success, however, depends largely upon an intelligent co-operation on the part of the crew of the stranded vessel.

Signals.—In accordance with the International Convention for the Safety of Life at Sea, 1948, Chapter V, Regulation 16, the following signals shall be used by life-saving stations when communicating with ships in distress and by ships in distress when communicating with life-saving stations:—

(a) *Replies from shore station to distress signals made by a ship:—*

<i>Signal</i>	<i>Signification</i>
<i>By day.</i> —White smoke signal.	} “You are seen—assistance will be given as soon as possible.”
<i>By night.</i> —White star rocket.	

(b) *Landing signals for the guidance of small boats bringing away the crew of a wrecked ship:—*

<i>Signal</i>	<i>Signification</i>
(i) <i>By day.</i> —Vertical motion of a white flag or the arms. <i>By night.</i> —Vertical motion of a white light or flare. A range (indication of direction) may be given by placing a steady white light or flare lower and in line with the observer.	} “This is the best place to land.”
(ii) <i>By day.</i> —Horizontal motion of a white flag or arms extended horizontally. <i>By night.</i> —Horizontal motion of a white light or flare.	
(iii) <i>By day.</i> —Horizontal motion of a white flag, followed by the placing of the white flag in the ground and the carrying of another white flag in the direction to be indicated.	} “Landing here highly dangerous.”
	} “Landing here highly dangerous. A more favourable location to land is in the direction indicated.”

Page 11 continued.

By night.—Horizontal motion of a *white* light or flare, followed by the placing of the *white* light or flare on the ground and the carrying of another *white* light or flare in the direction to be indicated.

"Landing here highly dangerous. A more favourable location to land is in the direction indicated."

(c) *Signals to be employed in connection with the use of shore life-saving apparatus*:—

Signal

Signification

(i) *By day*.—Vertical motion of a white flag or the arms.

By night.—Vertical motion of a *white* light or flare.

In general—"Affirmative."

Specifically:—

"Rocket line is held."

"Tail block is made fast."

"Hawser is made fast."

"Man is in the breeches buoy."

"Haul away."

(ii) *By day*.—Horizontal motion of a white flag or arms extended horizontally.

By night.—Horizontal motion of a *white* light or flare.

In general—"Negative."

Specifically:—

"Slack away."

"Avast hauling."

Page 26.—Line 3: *Delete* "(Nenusa islands) "

Line 4: *Delete* "(Merampi) "

Line 7: *For* "345 feet (105^m2) " *read* "346 feet (105^m5) "

Line 8: *Delete* "(Itata) "

Line 11: *For* "4° 40' " *read* "4° 41' "

Line 14: *Delete* "(Mioro) "

Line 17: *Delete* "(Karaton) "

Lines 18-19: *For* "A 10-foot (3^m0) patch " *read* "Napoe Arampoea, with a depth of less than 6 feet (1^m8) over it,"

After line 20 insert:—

A shoal, with a depth of 15 fathoms (27^m4) over it, was reported, in 1946, to lie nearly 2 miles southward of Kakaroetan.

Page 27.—Line 5: *Delete* "(Talaur) "

Line 6: *Delete* "(Kaburuang) "

Line 15: *For* "2,228 feet (679^m1) " *read* "2,229 feet (679^m4) "

Line 17: *For* "1,572 feet (479^m1) " *read* "1,573 feet (479^m4) "

Line 29: *After* "obtained " *insert* ", in a depth of from 7½ to 13 fathoms (13^m7 to 23^m8),"

Line 32: *For* "Essang bay " *read* "Baai van Essang "

Line 33: *Delete* "(Larue) "

Line 35: *Delete* "(Essang) "

Line 46: *For* "Batu Baranggo anchorage " *read* "Baai van Batoem-baranggo "

Page 28.—Line 2: *Delete* "(Wawaba) "

Line 3: *Add*:—A reef, reported to have a depth of 6 feet (1^m8) over it, lies about 3 cables west-south-westward of Noesa Topor.

Line 4: *For* "Beo bay " *read* "Reede Beo "

Line 18: *Delete* "11 " to "head " and *substitute* "30 feet (9^m1), from the mast of a wreck at the seaward end "

Page 28 continued.

Line 32: After "Anderoewo" insert " (Anderoewe) "

Line 33: Delete " (Nusa) "

Line 40: Delete and substitute:—

Chart 930, plan of Straat Liroeng and Reede Sereh.

Line 44: Delete " (Saha Is) "

Lines 45-48: Delete "There" to "east-north-" and substitute "Napoe Mapao, with a depth of $4\frac{1}{4}$ fathoms (7^m8) over it, lies about 2 miles north-westward of Saraä Kechil, and $5\frac{1}{2}$ - and $4\frac{3}{4}$ -fathom (10^m1 and 8^m7) coral patches lie about $1\frac{1}{4}$ miles west-north-westward and northward of the western extremity of that islet; several shoals, with depths of from $1\frac{1}{2}$ to $5\frac{1}{2}$ fathoms (2^m7 to 10^m1), lie within about $1\frac{1}{4}$ miles east-north-eastward and east-south-eastward of the eastern extremity of the same islet. Depths of 9 feet (2^m7) extend from a position on the southern side of Karakelong about $2\frac{1}{2}$ miles north-north-eastward of Saraä Kechil and a detached shoal, with a depth of 9 feet (2^m7) over it, lies about $2\frac{1}{4}$ miles north-north-"

Page 29.—Line 1: Delete and substitute:—

Chart 930, plan of Straat Liroeng and Reede Sereh.

Line 9: Delete " (Lirung) "

Line 17: For "1,201 feet (366^m1)" read "1,202 feet (366^m4)"

Line 25: Delete "4°" to "38°" and substitute "4° 03' N., Long. $126^{\circ} 37'$ "

Line 26: For "3-fathoms (5^m5)" read "16-foot (4^m9)"

Line 28: Delete and substitute:—

Chart 930, plan of Straat Liroeng and Reede Sereh.

Line 33: For "Salebabu anchorage" read "Reede Salebaboe"

Line 51: For "(Toa), 1,575 feet (480^m1)" read " , 1,576 feet (480^m4) "

Page 30.—Line 15: Delete and substitute:—

" , Mamanoek, Matoetoeang,"

Line 16: Delete " (Dumarcha) "

Line 21: For "456 feet (139^m0)" read "457 feet (139^m3)"

Line 24: For "115 feet (35^m0)" read "116 feet (35^m4)"

Lines 45-46: Delete "Mamanoek" to "high." and substitute:—

Mamanoek, 201 feet (61^m3) high and covered with palm trees, lies on an extensive reef which extends about $4\frac{1}{2}$ miles southward and south-eastward, and is situated about 12 miles east-south-eastward of Kemboling; there are some houses at its south-western end.

Page 31.—Lines 2-3: For "5-fathom (9^m1) patch between" read " $4\frac{1}{4}$ -fathom (8^m7) patch between the latter and the island"

Line 5: For "217 feet (66^m1) high" read "218 feet (66^m4) high and covered with coconut palms"

Line 11: For "932 feet (284^m1)" read "933 feet (284^m4)"

Line 13: After "high" insert "and covered with trees. There is an islet with some trees on it on its western side and a high rock off its south-eastern side"

Line 30: For "72" read "76"

Page 32.—Line 4: Delete " (Buang) "

Line 8: Delete " (Malihat) "

Line 9: Delete " (Makohat) "

Page 32 continued.

Line 10: For "4-fathom (7^m3) " read "3½-fathom (6^m9) "

Line 11: For "a rock " read "an above-water rock "

Line 13: Delete "161 " to "(27^m1) " and substitute "162 feet (49^m4) high, and Inis, 90 feet (27^m4) "

Line 18: Delete "(Nipa) " to "(Bukide) " and substitute "Boekide "

Line 22: For "981 feet (299^m0) " read "982 feet (299^m3) "

Line 32: For "2½-fathom (4^m1) " read "2½-fathom (4^m6) "

Line 38: Delete "(Awu) "

Line 44: For "Kaloesa " read "Kalasoega "

Line 53: Delete "(Maseli) "

Page 33.—Line 6: For "Taruna bay " read "Baai van Tahoena "

Line 7: After "Light.—" insert "Beacons.—"

Line 9: Delete "(Taruna) "

Lines 10-11: Delete "bay, where " to "steps " and substitute "bay. There is a hospital and a resident doctor."

Line 12: After "exhibited " insert "occasionally "

Line 13: For " , on the root of the pier." read "about a mile north-eastward of the southern entrance point to the bay."

Two unofficial leading beacons stand about 7 and 11 cables eastward of the light-structure; the front beacon is surmounted by a white triangle, the rear by a white inverted triangle. These beacons in line, bearing 070°, lead to the anchorage."

Line 15: For "pier " read "light-structure "

Line 25: Delete "(Bonaking) "

Lines 27-28: Delete and substitute:—

A mooring buoy, for the use of government vessels, is laid about 2½ cables east-south-eastward of the light-structure.

Line 29: For "Manganitu bay " read "Baai van Manganitoe "

Line 31: Delete "(Kalingangin) "

Line 38: Delete "(Tatone) " and "(Bokide) ".

Line 40: For "3 cables north-eastward " read "2 cables eastward "

Line 51: For "Dago bay " read "Baai van Dago "

Line 53: Delete "(Toade Menando) "

Page 34.—Line 1: For "Dago bay " read "Baai van Dago "

Line 5: Delete "(Mahome) " to "(240^m5) " and substitute " , an island, 788 feet (240^m2) "

Line 12: Delete "(Kalawatu) "

After line 18 insert:—

There is a flagstaff at the root of the pier.

Line 21: Delete "(Lipango) "

Line 26: For "125° 33' " read "125° 35' "

Line 37: Delete "(Punguwatu) "

Line 39: For "612 feet (186^m5) " read "611 feet (186^m2) "

Line 50: For "Tabukan " read "Taboekan "

Line 52: Delete "(Tabukan) "

Page 35.—Line 1: For "Tabukan " read "Taboekan "

Line 4: For "Peta bay " read "Baai van Peta "

Line 5: Delete "Buoys.—"

Line 6: Delete "(Buhiase) "

Lines 13-15: Delete and substitute:—

Page 35 continued.

A beacon surmounted by a white triangle stands on Tanjong Boehiase; a similar beacon stands on the western side of the bay about $5\frac{1}{4}$ cables north-westward of Tanjong Boehiase.

Line 42: For "*Kulur bay*" read "*Baai van Koeloer*"

Line 43: Delete "(Kulur)"

Line 48: For "*Menalu road*" read "*Baai van Menaloe*"

Page 36.—Line 1: For "*Menalu road*" read "*Baai van Menaloe*"

Line 5: For "(Maletahan)" read "(Batoe Malitehang)"

Line 9: For "4" read "5"

Line 16: For "46 feet (14^m0)" read "7 fathoms (12^m8), and close north-westward of the $4\frac{3}{4}$ -fathom (8^m7) patch in the fairway"

Line 17: After "hill" insert ", but care must be taken to avoid the $4\frac{3}{4}$ -fathom (8^m7) patch. During the northerly monsoon there is a heavy sea in this channel, and its use during that season is not recommended"

Line 34: Delete "(Saluran)"

Lines 40-41: For "3° 28' N., Long. 125° 41'" read "3° 27' N., Long. 125° 40'"

Line 52: Delete "(Beng Laut)"

Page 37.—Line 4: For "*Ngalipaeng bay*" read "*Baai van Ngali-paeng*"

Line 21: Delete "(Karakitang)"

Line 29: For "129 feet (39^m3)" read "457 feet (139^m3)"

Lines 30-31: Delete "Some" to "Mahengetang" and substitute:—"There is an islet about half a cable westward and three low rocks about half a mile west-north-westward of Mahengetang"

Line 33: Add:—There is a village on the northern side of the island and another with a flagstaff on the western side.

Line 38: Add:—Tide rips and eddies occur off the southern and western sides of Mahengetang.

Line 39: For "336 feet (102^m4)" read "338 feet (103^m0)"

Line 40: Delete "(Nitu)"

Line 42: For "which dries" read "with a depth of less than 6 feet (1^m8) over it"

Line 54: Delete "(Nenung)"

Page 38.—Line 3: For "3 cables northward and" read "5 cables northward and 8 cables"

Line 5: For "9 fathoms (16^m5)" read " $8\frac{1}{2}$ fathoms (15^m5)"

Line 11: For " $2\frac{3}{4}$ -fathom (5^m0)" read " $5\frac{1}{2}$ -fathom (10^m1)"

Line 12: Add:—A $2\frac{3}{4}$ -fathom (5^m0) patch lies about $1\frac{1}{4}$ miles east-north-eastward of Bowondeke.

Tidal streams.—Early in February 1940, between Sanggeloehang and Tahoelandang (page 39) an easterly set at a rate of from $1\frac{1}{4}$ to $2\frac{1}{4}$ knots was experienced.

Line 13: Delete "(Siau)"

Line 27: For "*Sawang and Ulu roads*" read "*Reede Oeloe*"

Line 28: Delete "(Ulu road)"

Line 29: After "village," insert "in which is the residence of the Raja of Siaoë,"

Line 31: After "light is" insert "occasionally"

Line 35: For "eastward" read "east-north-eastward"

Page 39.—Line 22: *Delete* "lies" to "of" and *substitute* "extends about a mile southward from"

Line 24: *For* "2° 45'" *read* "2° 44'"

Lines 29-30: *Delete* "(Tagu-landang)"

Line 42: *Delete* "(Ruang)"

Page 40.—Line 12: *After* "083°," *insert* "the north-eastern extremity of Biaro (see below) bearing 181°"

Line 16: *For* "Buhias road" *read* "Reede Boehias"

Line 17: *Delete* "(Buhias road)"

Line 36: *Delete* "(West point)"

Line 44: *Delete* "(East point)"

Line 52: *For* "2½-fathom (5^m0)" *read* "2½-fathom (4^m6)"

Page 41.—Line 5: *Delete* "(Biaro)"

Line 37: *After* "(page 42)" *insert* "where cargo for Menado can be discharged"

After line 37 *insert*:—

■Due to lost anchors and cables, there are several foul areas in the roadstead; their positions can be seen on the plan.■

Lines 47-53: *Delete*.

Page 42.—Lines 2-3: *Delete*.

Lines 6-11: *Delete* "The" to "beacon."

Lines 14-15: *For* "the beacon marking" *read* "a position about 3½ cables northward of the entrance to the river, which indicates"

After line 27 *insert*:—

There is a radio station. See page 10.

Lines 40-42: *Delete* and *substitute*:—

It is reported that the southern extremity of Siladeng (page 43), bearing 288°, astern, leads into the bay between the two southwestern reefs, in a least depth of 17 fathoms (31^m1).

Line 47: *For* "outside" *read* "inside"

Lines 47-48: *Delete* "on the" to "beacons." and *substitute* "with the western entrance point of the bay bearing 180°."

Line 54: *Add*:—A fairly strong tidal stream may set across the entrance.

Page 43.—*After* line 26 *insert*:—

Chart 930, plan of Straat Bangka.

Line 28: *Delete* "(Banka strait)"

Line 29: *Delete* "(Puisan)"

Line 31: *Delete* "(Ganga)"

Line 40: *For* "3" *read* "2"

Line 45: *For* "292 feet (89^m0)" *read* "331 feet (100^m9)"

Lines 46-47: *Delete* "A" to "Gangga." and *substitute*:—A 3½-fathom (5^m9) patch and a 5½-fathom (10^m1) patch lie about 5½ cables eastward and 3½ cables southward, respectively, of the southern extremity of Ganga.

Line 52: *Add*:—Depths of 6 fathoms (11^m0), or less, extend about 2 cables north-westward from the northern extremity of the islet.

Page 44.—Line 1: *Delete and substitute:—*

Chart 730, plan of Straat Bangka.

Line 2: *For "4" read "2"*

Lines 3-4: *For "1,175 feet (358^{m2})" read "1,145 feet (349^{m0})"*

Line 5: *Delete "(Arus)"*

Line 11: *For "5 fathoms (9^{m1})" read "4 fathoms (7^{m8})"*

Line 14: *For "5 to 6 fathoms (9^{m1})" read "4 to 6 fathoms (7^{m3})"*

Lines 17-18: *Delete "(Banka)" to "on" and substitute " , the easternmost of the islands, on the northern side of "*

Line 19: *For "1,139 feet (347^{m2})" read "1,158 feet (352^{m9})"*

Line 21: *For "277 feet (84^{m4})" read "266 feet (81^{m1})"*

Line 25: *Delete "(Jiko)"*

Line 39: *For "972 feet (296^{m3})" read "909 feet (277^{m1})"*

Page 45.—Line 1: *Delete and substitute:—*

Chart 930, plan of Straat Bangka.

Line 12: *For "Likupang road" read "Reede Likoe pang"*

Line 13: *Delete "(Likupang)"*

After line 19 insert:—

A rock, with a depth of less than 6 feet (1^{m8}) over it, lies about 1½ miles eastward of the northern extremity of Tamperong.

Line 20: *For "3-fathom (5^{m5})" read "2¾-fathom (5^{m0})"*

Lines 21-22: *For "3 fathoms (5^{m5})" read "2¾ fathoms (5^{m0})"*

Line 25: *For "6½" read "6"*

Lines 26-27: *Delete "from" to "16^{m5})" and substitute "about 13 fathoms (23^{m8})"*

Line 32: *For "Talisei road" read "Reede Talisei"*

After line 47 insert:—

A 1¾-fathom (3^{m2}) patch, with a 3-foot (0^{m9}) patch close north-north-eastward of it, lies about one cable south-south-eastward of the head of the pier.

Page 46.—Lines 38-39: *Delete "is" to "high" and substitute "consists of masses of black and red rocks covered with trees and shrubs"*

Line 43: *Add:—The north-eastern extremity of the island is a wedge-shaped rock, about 200 feet (61^{m0}) high.*

Page 47.—*After line 3 insert:—*

A pinnacle rock, charted as with a depth of less than 6 feet (1^{m8}), lies about 3¼ miles south-south-westward of the northern extremity of Lembeh and about 2 cables off the western side of that island.

Line 5: *After "Dangers.—" insert "Buoy.—"*

Line 7: *After "reefs" insert "on each of which are two rocks"*

Line 9: *After "visible." insert:—There is a depth of 1½ fathoms (2^{m3}) about 2 cables south-westward of the western extremity of the south-western islet. There is also a small islet, about 20 feet (6^{m1}) high, about one cable northward of the north-eastern islet.*

Line 11: *After "islet" insert " , it is marked on its northern side by a white conical buoy surmounted by a ball; a 2¾-fathom (5^{m0}) shoal lies about one cable westward of the 2½-fathom (4^{m6}) shoal; vessels should pass eastward of the buoy"*

Line 12: *For "lies" read " , and a rock which dries, lie "*

Page 47 continued.

Line 13: After “-westward” insert “and westward”

After line 13 insert:—

Kampung Bitung, a large village and a copra station, lies on the northern shore at the south-western entrance to the narrows, about $2\frac{1}{4}$ miles south-westward of the south-western islet; anchorage may be obtained off this village in a depth of 20 fathoms (36^m6); the shore is steep to here. A wharf was under construction at Bitung, in 1953.

The village of Aer Tembaga stands near the coast about 11 cables north-eastward of Kampung Bitung.

After line 20 insert:—

A shoal, with a least depth of $3\frac{3}{4}$ fathoms (6^m9) over it, lies about a quarter of a mile off the south-eastern shore of the strait and $1\frac{1}{2}$ miles eastward of Kampung Bitung; about three-quarters of a mile east-north-eastward and $3\frac{3}{4}$ cables westward of this shoal are two 5-fathom (9^m1) patches, each about 2 cables offshore.

After line 30 insert:—

Good sheltered anchorage, in depths of from 17 to 20 fathoms (31^m1 to 36^m6), with no strong tidal streams, may be obtained southward and south-westward of the two islets in the middle of the strait.

Line 39: For “Batu” read “Batoe”

Line 41: For “ $1^\circ 21'$ ” read “ $1^\circ 22'$ ”

Lines 43-45: Delete “A” to “(5^m0),” and substitute “Shoals, with depths of $3\frac{1}{4}$ and $5\frac{1}{2}$ fathoms (5^m9 and 10^m1) over them, lie about $1\frac{1}{2}$ cables eastward and $4\frac{1}{2}$ cables east-north-eastward, respectively, of Batoe Nonna and a 3-fathom (5^m5) patch”

Page 48.—Line 21: Delete “(Mayo)”

Line 22: For “1,352 feet (412^m1)” read “1,353 feet (412^m4)”

Line 28: For “598 feet (182^m3)” read “600 feet (182^m9)”

Line 29: Delete “(Gureda)”

Line 31: For “8 feet (2^m4)” read “less than 6 feet (1^m8) over it”

Page 50.—Line 34: After “(69^m5);” insert “good anchorage may be obtained, in a depth of about 9 fathoms (16^m5), amongst the outer patches in the bay, with Tjaoeraga (Chauraga), a rock situated about 2 miles eastward of the northern extremity of Adoei, bearing 109° , and with Tanjong Rongi Mhé (see below) in line with Komo, a rock about one mile north-north-eastward, bearing 205° ;”

Page 52.—After line 33 insert:—

A shoal, with a depth of $9\frac{3}{4}$ fathoms (17^m8) over it, was reported, in 1952, to lie about $5\frac{1}{2}$ cables south-eastward of the pierhead at Djailolo; its position is approximate.

Page 53.—[Line 20: Delete “surmounted by a cone”]

Line 35: For “Beacon.—” read “Beacons.—”

Line 41: Delete and substitute:—

In 1944, two beacons, each consisting of a pile surmounted by a white ball, stood on each atoll.

Page 54.—After line 3 insert:—

An uncharted reef, marked, in 1944, by a post carrying a flag, lies near the Halmahera shore northward of Woda; in 1944, the edge of

Page 54 continued.

the reef extending from Tanjong Njarigiro, nearly one mile northward of Woda, was marked by a post surmounted by a black topmark.

Line 35: *Delete* " **Beacon.**—"

Line 39: *Delete.*

Page 56.—Line 18: *For* " 13 feet (4^m0) " *read* " 14 feet (4^m3) "

Line 19: *After* " from it " *insert* " ; there are no bollards, hawsers are run to dolphins, or, for small vessels, to iron frames inside the ends of the T head; the dolphins should be used with caution as, in 1951, most of them were in bad condition "

Lines 26-27: *Delete.*

After line 34 insert:—

Beacon.—A beacon with a white cone stands at Toboko, situated about half a mile south-south-westward of Hertog Hendrick pier. **]**

After line 37 insert:—

Some radio masts and a church steeple are situated about 2 cables north-north-westward and **[2½]** cables north-westward, respectively, of the light on the head of the northern pier.

Line 39: *Delete* " about " to " hours " and *substitute* " it requires chlorination before it is fit to drink; the rate of supply is about 10 tons per hour "

Page 59.—Line 23: *For* " seaward." *read* " seaward, but it is only suitable for small vessels, being close to the shore. Larger vessels anchor in a depth of 40 fathoms (73^m2), off Tagono village, with the eastern point near Akedabo village (*see below*) bearing 013°, and the point near the cargo shed bearing 337°."

Page 60.—Line 39: *For* " Besar." *read* " Besar; as the coastal reef extends a considerable distance from Besori Kechil, it is advisable to keep towards the Besori Besar side of the channel. Rain makes the water muddy, the reefs then cannot be seen."

Page 61.—Line 23: *For* " cone " *read* " drum "

Line 24: *For* " 1936 " *read* " 1951 "

Line 54: *Add:*—In 1953, the topmark was missing.

Page 62.—Line 3: *After* " knots " *insert* " , but they are not as strong as those in Straat Nanoang "

Page 64.—Line 10: *After* " is a " *insert* " stone landing pier and a "

Page 69.—Line 34: *Add:*—Good sheltered anchorage for small craft may be obtained in a large lagoon, the entrance to which, with a depth in it of 4½ feet (1^m4), lies close southward of the south-eastern end of the eastern islet.

Page 70.—Line 4: *Delete and substitute:—*

" doto, with the conspicuous tree on the southern hill of Djoronga bearing 296°. Sheltered anchorage may be obtained, in a depth of 7 fathoms (12^m8), close within the entrance, with Tawabi village bearing 018°, the northern end of Koebi bearing 299° and Batu Anjer (*see below*) in line with the southern end of Tadokoe islet, bearing 117°. Vessels should not go beyond that position. Care is necessary inside

Page 70 continued.

the islet as the deeper parts have much the same appearance as some dark rocks against the white sandy bottom. From the head of the inlet there is a boat channel across the reefs westward."

Page 71.—Line 34: *After " pier " insert " and a flagstaff "*

After line 50 insert:—

It was reported, in 1950, that the north-eastern coast of the island lies from 4 to 5 miles further north-north-eastward than charted.

Page 72.—Lines 51-52: *Delete " danger " to " 4½ " and substitute " dangers being two reefs, each with a depth of less than 6 feet (1m8) over it, lying about 4½ and 6½ "*

Page 73.—Line 4: *After " Dangers.—" insert " Buoyage.— Beacon.—"*

After line 45 insert:—

A shoal, with a depth of 17 fathoms (31m1) over it, lies about 3½ miles west-north-westward of the northern extremity of Ngèlé Ngèlé Besar.

A 20-foot (6m1) patch lies about 2 miles north-eastward of the northern extreme of Ngèlé Ngèlé Besar, and 6 cables off the coast of Morotai.

A 22-foot (6m7) patch, a 25-foot (7m6) patch and a shoal, with a depth of 23 feet (7m0) over it, lie near the fairway of the channel between Ngèlé Ngèlé Besar and the Morotai coast and about a mile eastward, a mile south-south-eastward and 1½ miles south-eastward, respectively, of the northern extreme of Ngèlé Ngèlé Besar.

A 16-foot (4m9) patch and a 25-foot (7m6) patch lie on the eastern side of the fairway about a mile east-north-eastward and 9 cables eastward, respectively, of Ngèlé Ngèlé Kechil.

After line 50 insert:—

A 15-foot (4m6) patch lies on the eastern side of the channel between Loleba Besar and the Morotai coast about a mile east-south-eastward of the northern extreme of the island.

Pasir Besar, which dries, lies about a mile southward of Loleba Kechil; a 3-fathom (5m5) patch lies about half a mile eastward of the northern extremity of Pasir Besar.

A 3-foot (0m9) patch lies in the fairway between Galo Galo Besar and Dodola Besar and about 8 cables south-westward of the southern extremity of the former island.

Line 51: *After " Kokoja " insert " (Kokoya) "*

Line 50: *After " Galo Galo Besar." insert " A conspicuous tree stands on the reef about one cable northward of the north-western extremity of Dodola Besar."*

Page 74.—*After line 5 insert:—*

A 5½-fathom (10m1) patch lies in the fairway nearly midway between Dodola Besar and Pasir Besar; a 16-foot (4m9) patch lies about 8 cables eastward of the southern extreme of Dodola Besar.

Line 6: *After " islets " insert " and shoals "*

Line 7: *Add:—*The following shoals are marked by beacons or buoys:—

A 3-foot (0m9) patch, marked by a beacon surmounted by a triangle, about 2½ miles east-north-eastward of Kolorai.

Page 74 continued.

A reef, marked by a spherical buoy, about $4\frac{1}{2}$ miles eastward of Kolorai and close off the Morotai coast.

A 16-foot (4^m9) patch and an 18-foot (5^m5) shoal, each marked by a beacon surmounted by a triangle, lying, respectively, about $1\frac{1}{4}$ and $3\frac{1}{4}$ miles east-south-eastward of Kolorai.

A 6-foot (1^m8) patch, a 16-foot (4^m9) patch and a 13-foot (4^m0) patch, each marked by a spherical buoy, about one mile north-north-eastward, $1\frac{1}{4}$ miles north-eastward and nearly $2\frac{1}{2}$ miles east-north-eastward, respectively, of Kokoja.

A 14-foot (4^m3) shoal, marked on its western side by a red buoy, situated close north-westward of Nip shoal.

Nip shoal lies about $3\frac{1}{2}$ miles east-north-eastward of Kokoja, and half a mile off the Morotai coast.

Line 10: *After* "point" *insert* " ; the south-western extremity of the spit is marked by a red cylindrical buoy "

Line 13: *Delete* and *substitute*:—

"The eastern extremity of Kokoja in line with the middle of Kolorai, bearing about 342° ,"

Line 19: *For* "26 feet (7^m9)" *read* "19 feet (5^m8)"

Line 22: *After* "dries" *insert* "one foot (0^m3)"

Line 49: *After* "Limaoe village." *insert*:—A 9-foot (2^m7) patch lies nearly three-quarters of a mile west-north-westward of Tanjong Loeari.

Page 76.—Line 3: *For* "Koemoe (Kumu)" *read* "Kumu"

Lines 10-12: *Delete* "Koemoe" to "Ubu" and *substitute* "Kumu. The western end of the edge of the reef fringing the southern side of Kumu is marked by a beacon. Ubu Ubu"

Line 14: *Delete* "surmounted" to "cone,"

Lines 15, 30 and 34: *For* "Oeloe Oeloe" *read* "Ubu Ubu"

Lines 16-17: *Delete* "by a" to "and"

Lines 18-19: *Delete* "close" to "side" and *substitute* ", with a depth of one foot (0^m3) over it, lies about one cable northward of the northern extremity of the reef on which stands Ubu Ubu"

Line 29: *For* "Koemoe" *read* "Kumu"

Lines 31-32: *Delete* and *substitute*:—

"northward of the beacon marking the northern edge of the reef extending from Ubu Ubu and steer for the southern pier, passing southward of several shoal patches, which are of a light brown colour and can be clearly seen; when clear of the southernmost patch, vessels should haul sharply northward, with Tonoeoe just open eastward of Tanjong Pilawana, and anchor before the southern end of Tagaja closes behind Kumu."

Page 81.—*After* line 11 *insert*:—

A shoal, with a depth of 3 feet (0^m9) over it, lies about $1\frac{1}{4}$ miles eastward of Boeli village.

Line 36: *After* "Dangers.—" *insert* "Light.—Volcanic disturbance.—"

After line 50 *insert*:—

A submerged reef was reported, in 1945, to lie about $13\frac{1}{2}$ miles north-eastward of Jiew island.

Page 81 continued.

Charts 2788 and 3248.

Volcanic disturbances have been reported in an area 15 miles wide between Lat. $0^{\circ} 18' N.$, Long. $129^{\circ} 54' E.$ and Lat. $1^{\circ} 00' N.$, Long. $129^{\circ} 00' E.$, and, in 1948, a great disturbance was observed in an area, with a radius of about one mile, centred about 12 miles eastward of Jiew island.

Chart 2788.

A light is exhibited, at an elevation of 27 feet (8^m2), from the eastern end of Jiew island. This light was extinguished, in 1947.

Page 82.—Line 36: *For "942b" read "3248"*

Line 40: *For "1,245 feet (379^m5)" read "1,297 feet (395^m3)"*

Page 83.—Line 34: *Add:*—The passage to the landing pier through the shore reef is narrow and caution is necessary in its navigation.

Line 38: *For "is sometimes difficult, but" read "is difficult during the southerly monsoon, and the landing pier should not then be used owing to two rocks close off it;"*

Line 49: *For "half a mile" read "one mile"*

Page 84.—Line 44: *After "(34^m7)."* insert "There are five small wooden piers at the village."

Page 86.—Line 45: *Delete "two" to "rectangle" and substitute "three beacons surmounted, respectively, by a rectangle, a cylinder and a ball"*

Lines 49-50: *Delete "and by" to "side,"*

After line 52 insert:—

A reef, which dries and is marked by a beacon surmounted by a ball, lies nearly 8 cables south-south-westward of Koelefoe.

The shore reef off Weda village is marked by a beacon surmounted by a white ball.

Page 87.—Line 16: *Delete "Beacon.—"*

Lines 17-18: *Delete "; it is" to "cone"*

Page 88.—Lines 5 and 10: *Delete "the beacon marking"*

Line 13: *For "942b" read "3248"*

Line 16: *Delete "(Ubulie)"*

Line 18: *Delete "(Tuli)"*

After line 31 insert:—

Tidal streams.—For tidal streams off the north-western and south-eastern ends of Gébé, *see* page 82. At springs, the tidal streams in the vicinity of Fau, and particularly between Fau and Gébé, are strong.

Lines 33-34: *Delete "shelter" to "here." and substitute "shelter; the entrance is about $2\frac{1}{2}$ cables wide, and there are depths of from 7 to 12 fathoms (12^m8 to 21^m9) in the passage."*

Line 38: *After "Fau" insert "is foul, but there is a channel, with a depth of 3 fathoms (5^m5), it"*

Line 44: *For " $0^{\circ} 09'$ " read " $0^{\circ} 08'$ "*

Line 52: *Delete and substitute:—*

Page 88 continued.

Chart 3248.

Line 53: *Delete* " Joe " to " low " and *substitute* " Joe, 182 feet (55^m5) high, and Oeta, which is low, are "

Page 89.—Line 1: *Delete* and *substitute*:—
Chart 3248.

Line 5: *For* " one " *read* " half a "

After line 14 *insert*:—

Anchorage may be obtained in favourable weather off the south-western end of Oeta, in a depth of 35 fathoms (64^m0) about one cable from the shore, with the western point of the island bearing 005° and the southern point 083°.

【Line 27: *After* " point." *insert*:—A shoal with a depth of about 2 fathoms (3^m7) over it, lies about 6 cables westward of Madjet, in the entrance to an inlet.】

Page 94.—Lines 20-27: *Delete* and *substitute*:—

A rock, with a depth of 5 feet (1^m5) over it, and a one-foot (0^m3) patch lie, respectively, about one mile and 2 miles eastward of the Taboeloe eilanden; a ridge, at the north-western end of which there is a patch which dries and at the south-eastern end a patch with a depth of about 2 feet (0^m6) over it, lies about 6 miles eastward of the same islands.

Vessels are cautioned not to pass between the Taboeloe eilanden and the one-foot (0^m3) patch.

Koro, a low island covered with vegetation, is situated about 9 miles eastward of the Taboeloe eilanden.

Eastward of the Taboeloe eilanden the coast has a different aspect from that westward; it is more rocky and the prominent headlands are steeper.

Page 98.—Line 11: *For* " Sanana bay " *read* " Baai van Sanana "

Line 19: *Add*:—In 1951, the topmark of the northern beacon was missing.

Lines 22-23: *Delete* " are two " to " fort and " and *substitute* " is "

Lines 25-28: *Delete*.

Lines 32-33: *Delete* " keeping " to " 282° " and *substitute* " keeping the head of the pier bearing 283° "

Line 36: *Add*:—In 1945, the pier was in a bad state of repair and was unserviceable.

Page 99.—Lines 30-31: *Delete* " , and a " to " alongside "

After line 36 *insert*:—

Anchorage may be obtained in a depth of 29 fathoms (53^m0), about 2½ cables offshore, with the north-eastern and south-eastern points of Bèlang Bèlang bearing 340° and 232°, respectively; vessels approach this anchorage steering 324° with two high trees, near the north-eastern point, ahead.

Page 100.—【Lines 8-9: *Delete* " one " to " north- " and *substitute* 6 miles north-north-west-”】

【Line 11: *For* " north-westward of Lodji " *read* " offshore, about 5½ miles northward of Tanjong Ake lamo ”】

Page 100 continued.

[Lines 13-15: Delete " At " to " Lodji " and substitute:—

" At Tanjong Kawassi, situated about 3 miles north-north-westward of Tanjong Ake lamo, and also about 1½ miles northward of Tanjong Kawassi "]

Line 28: After " northward " insert " and a reef, with a similar depth over it, about three-quarters of a mile west-north-westward "

Page 101.—Line 25: Add:—A 656-foot (199m9) hill, situated about 2½ miles west-south-westward of Tanjong Anggai, is conspicuous from both eastward and westward.

Page 103.—After line 20 insert:—

There is a well of fresh water in the middle of Watinger.

Page 104.—After line 34 insert:—

Anchorage, sheltered in the northerly and partially sheltered in the southerly monsoon, may be obtained in depths of from 16 to 40 fathoms (29m3 to 73m2), off the western side of Boo Ketchil; the best approaches are from north-eastward and northward, on either side of Taudore, an island about three-quarters of a mile northward of the north-western end of Boo Ketchil.

[Line 46: For " 655 feet (199m6) " read " 657 feet (200m2) "]

Page 105.—After line 6 insert:—

The eastern end of the island is totally uninhabited; mangrove swamps lie 10 yards (9m1) behind the beaches.

[Line 23: Delete " (Jailolo) "]

[Line 31: Delete " (Der) "]

Line 47: For " Djailolo " read " the eastern end of Ef Torobi "

After line 47 insert:—

It is not advisable to anchor close to low mangrove shores, as these areas, especially in the southern parts, abound in small flies whose bite causes severe irritation usually lasting about three days.

[Line 49: Delete " (Yamtu) "]

[Page 106.—Line 15: For " 2½-fathom " read " 15-foot "]

[Page 107.—Line 4: Delete " (Saddle peak) "]

[Line 5: Delete " (Cupola peak) "]

[Line 51: Delete " (Yadata) "]

[Page 108.—Line 3: Delete " (Yu) "]

[Line 7: Delete " (Yef Bi) "]

[Line 31: Delete " (Yef Pele) "]

[Line 32: Delete " (Kaunut) "]

[Line 42: Delete " (Bo) "]

[Lines 49-50: Delete " (Jal islands) "]

[Line 52: Delete " (Jam islands) "]

[Page 109.—Line 9: Delete " (Yaganan) "]

[Line 16: Delete " (Yapale) "]

[Line 18: Delete " (Ginyamato) "]

Page 110.—Lines 5-6: *Delete* “Anchorage” to “monsoon.” and *substitute*:—There is no good anchorage off the coastal villages; except in Bara baai the sea bottom rises so steeply to the shore almost everywhere that no good anchorage can be found even in the southerly monsoon.

Page 111.—Line 27: *For* “exhibited from” *read* “occasionally exhibited from an iron mast, 16 feet (4^m9) in height, situated at”

Lines 29-30: *Delete*.

After line 33 insert:—

A mosque situated about 1 $\frac{3}{4}$ cables north-westward of the pier is a prominent mark from seaward.

Page 112.—Lines 17-21: *Delete* “Vessels” to “on either side.” and *substitute*:—

Vessels should enter the channel either between Tengah and Tomahoe, or southward of Tengah; for larger vessels the passage between Tengah and Tomahoe is preferable, and in which the drying reefs show distinctly.

Page 113.—Line 39: *Delete* “Beacon.”

Page 114.—Lines 2-4: *Delete* “dries,” to “ball.” and *substitute* “dries.”

After line 27 insert:—

Outlying shoals.—A shoal, the position of which is approximate, was reported, in 1950, about 18 miles south-westward of the light-structure at the head of Leksoela baai.

Charts 3239, 942a.

A shoal, the position of which is doubtful, was reported, in 1927, about 35 miles south-south-westward of the light-structure at the head of Leksoela baai. *See also* page 140.

Chart 3241.

Page 115.—Line 10: *After* “distance;” *insert* “if the summit is obscured by cloud a useful alternative mark, on the same bearing, is a large round-topped tree which, on nearer approach, will be seen between two native houses in the village;”

Page 117.—Line 53: *After* “Manipa” *insert* “; the best anchorage is off the north-western coast in Reede Hajasa, situated in the bight between Tanjong Hapale and Tanjong Hakoeloeane about 3 miles north-eastward, in depths of from 9 to 25 fathoms (16^m5 to 45^m7); the head of the bight is encumbered with drying reefs and shoals; Reede Hajasa offers fair shelter in the south-east monsoon”

Page 118.—Line 24: *Add*:—Two shoals with depths of 1 $\frac{1}{2}$ and 2 fathoms (2^m7 and 3^m7) over them, lie, respectively, about 6 $\frac{3}{4}$ and 4 cables southward of Tanjong Haja.

After line 27 insert:—

Directions.—Approaching Lobang Haja from southward steer to make a good course of 015° with Tanjong Haja on that bearing, passing westward of the two shoals mentioned above, until a course

Page 118 continued.

of 357° will pass about half a cable westward of Tanjong Haja, then steer to make good that course past the point and through the strait.

Lines 34-36: *Delete* "Boano," to "reefs in it." and *substitute*:—"Boano. The passages northward and southward of the island are navigable by small vessels with local knowledge and lead into an inlet eastward of the north-eastern end of Poea; some of the dangers in the outer entrances to the passages are marked by beacons; in the inlet there is excellent landlocked anchorage in depths of from 6½ to 10 fathoms (11^m9 to 18^m3); the south-eastern end of the inlet is encumbered with drying reefs and shoals, between the outer and inner of which good anchorage for small craft may be had in depths of from 4½ to 6 fathoms (8^m2 to 11^m0)."

Page 120.—Line 22: *After* " (page 118) " *insert* " : the only known dangers, other than the two shoals southward of Tanjong Haja mentioned on page 118, are a 29-foot (8^m8) shoal situated about 2½ miles north-north-westward of Tanjong Sial and about half a mile offshore, and a rock, awash, which lies about 2 cables southward of Tanjong Sial "

Line 29: *After* " awash " *insert* " mentioned above "

Page 121.—Line 31: *After* " coast." *insert* " These islands have been cleared and planted with coconut trees."

After line 39 *insert*:—

A shoal, with a least depth of 16 feet (4^m9) over it, lies about 5 cables south-south-westward of Tengah.

Line 51: *After* " 055°," *insert* " taking care to avoid the 16-foot (4^m9) shoal about 5 cables south-south-westward of that islet,"

Line 54: *Delete*.

Page 122.—Lines 2-8: *Delete* and *substitute*:—

A vessel approaching from eastward when in mid-channel between Tengah and the Ceram shore, taking care to avoid the 16-foot (4^m9) shoal about 5 cables south-south-westward of Tengah, should steer 270° to pass northward of Lasi; when Itoea opens eastward of Besar a course may be set to pass either northward or southward of Telegraaf rif; alternatively, a vessel may follow the directions from westward reversed.

Line 42: *For* "Sawai and Bèsi bays" *read* "Baai van Sawai and Baai van Besi"

Line 48: *Delete* " (Raja) "

Line 53: *Delete* " (Hatu Supun) "

Page 123.—Line 1: *For* "Sawai and Bèsi bays" *read* "Baai van Sawai and Baai van Besi"

Line 3: *Delete* " (Lusaolat) " and " (Lusahiti) "

Line 8: *For* "Wahai and Hatiling bays" *read* "Baai van Wahai and Baai van Hatiling"

Line 23: *After* "mast." *insert* " The pier was unserviceable in 1948."

Page 124.—Line 1: *For* "Wahai and Hatiling bays" *read* "Baai van Wahai and Baai van Hatiling"

Page 125.—Line 18: For "bay" read "baai"

Line 19: Delete "(Tufa)"

Line 37: For "pier" read "stone pier about 2½ cables in length,"

Line 39: Add:—In 1948, the pier was in a bad state of repair.

Line 42: Delete.

Line 53: Delete "Beacons.—"

Page 126.—Lines 3-4: Delete "and is" to "beacons"

Page 127.—Line 28: For "Beacons.—" read "Beacon.—"

Line 42: Delete "; and is" to "beacons"

Line 51: For "989 feet (301^m4)" read "1,010 feet (307^m8)"

Page 128.—Lines 20-21: Delete "; it is" to "ball"

Line 52: After "Dangers.—" insert "Light.—"

Page 129.—Line 4: After "beacon" insert "surmounted by a white ball"

After line 7 insert:—

A light is occasionally exhibited at the head of the pier.

Line 9: Add:—In 1948, the pier was in a bad state of repair.

Page 130.—Line 34: For "Amahai bay" read "Baai van Amahai"

Line 35: Delete "Beacons.—"

Line 36: After "Koeako" insert "(Kuako)"

Line 37: Delete "(Umeputih)"

Lines 41-42: Delete ", and is" to "beacons"

Lines 50-51: Delete and substitute:—

A light is exhibited at the root of the boat pier which is in ruins.

Page 131.—Lines 12-15: Delete "thence" to "Tamilau." and substitute "thence to Tanjong Seitoe there are a number of detached shoals lying within one mile of the shore, including two sandbanks, Haoemoea (Haumua) and Pekelo, which nearly dry and which lie, respectively, about 15 and 21 miles eastward of Tanjong Tamilau and about three-quarters of a mile and 1¼ miles offshore.

There is a heavy surf on this coast during the south-east monsoon, which, in conjunction with earth tremors, causes portions of foreshore to break away and fall into deep water."

Line 34: Delete "Light.—"

Lines 36-38: Delete "there is" to "pier."

Line 40: For "root of the pier" read "beach at the western end of the village"

Page 132.—Line 35: Add:—Eastward of Tanjong Aran the coast is fringed by a broad drying reef.

Line 43: After "(Suru)," insert "also 2,370 feet (722^m3) high,"

Page 133.—Line 28: After "Setan" insert "1,850 feet (563^m9) high,"

Line 36: For "Amboina bay" read "Baai van Ambon"

Line 42: Delete "(Nusanive)"

Page 134.—Line 19: For "*Amboina bay*" read "*Baai van Ambon*"

Line 20: Delete "(Amboina bay)"

Line 24: For "453 feet (138^m1)" read "393 feet (119^m8)"

After line 26 insert:—

Chart 930, plan of entrance to Inner Harbour.

Line 28: For "6 fathoms (11^m0)." read "4½ fathoms (8^m7). A white mooring buoy lies on the eastern side of the entrance channel, about 4 cables south-westward of the western entrance point."

Line 29: For "*Amboina road*" read "*Reede Ambon*"

Line 30: After "Light.—" insert "Foul area.—"

After line 39 insert:—

A foul area, due to the loss of an anchor and cable, indicated on the plan, lies about 3½ cables north-north-eastward of the coaling wharf.

Lines 40-44: Delete "312 feet" to "pier." and substitute "328 feet (100^m0) in length, with a depth alongside, in 1948, of 30 feet (9^m1). A few yards northward of the site of the boat pier there are some old piles the heads of which only show at low water; care is necessary when boats are in the vicinity.

Three lights, vertically disposed, are exhibited from a flagstaff on the concrete wharf for the use of vessels in the approaches; when vessels are entering the lights are altered to indicate the appropriate tidal signal; see page 135."

Line 47: For "23 feet (7^m0)" read "21 feet (6^m4), in 1948,"

Line 48: Add:—

Vessels berthing heading westward are advised to exercise caution as the shore reef projects considerably, eastward of the wharf.

When berthing at the concrete wharf during the north-west monsoon masters of vessels should have bow and stern anchors ready for dropping to prevent damage to vessels and wharf.

A pier, 492 feet (150^m0) in length, crosses the drying coastal bank about 4 cables eastward of the coaling wharf.

Line 49: For "*Amboina bay*" read "*Baai van Ambon*"

Line 50: After "streams.—" insert "Signals.—"

Page 135.—Line 1: For "*Amboina bay*" read "*Baai van Ambon*"

After line 6 insert:—

The following tidal signals are shown from a flagstaff on the concrete wharf:—

A white cone over a white drum, by day; at night,
a white light over a red light to indicate . . . In-coming tide.

A white drum over an inverted white cone, by day;
at night, a red light over a white light to
indicate . . . Out-going tide.

A white drum between a white cone and an inverted
white cone, by day; at night, a white light to
indicate . . . Slack water.

Line 17: For "*Amboina road*" read "*Reede Ambon*"

Line 18: Delete "(Amboina)"

Line 20: Delete "(Batu Gajah)"

Line 26: Add:—At the concrete wharf, water can be supplied at the rate of 100 tons per day.

Line 27: For "a small" read "an ample"

Page 137.—Line 8: *Add*:—There is a pier at Pelauw with a depth of 12 feet (3^m7) at its head; it was damaged, in 1945.

Page 138.—Line 33: *Delete* "surmounted" to "cone,"

After line 47 *insert*:—

Saparoëa is the capital of Saparoëa province. There is a port doctor.

Chart reference at the foot of the page: *For* "842a" *read* "942a"

Page 140.—Line 12: *Delete* and *substitute*:—

Chart 3239.

Line 13: *For* "danger" *read* "dangers"

Line 15: *Delete* "This" to "danger" and *substitute* "A shoal, the position of which is approximate, was reported, in 1950, about 23 miles west-south-westward of the same point. See also page 114. These are the only known dangers"

Line 23: *For* "108 feet (32^m9)" *read* "106 feet (32^m3)"

Page 143.—Line 10: *Add*:—There is a least depth in the fairway of 26 feet (7^m9).

Line 11: *For* "Light.—" *read* "Lights.—"

After line 15 *insert*:—

Two lights are occasionally exhibited at the head of the western pier.

Page 144.—Line 3: *After* "important." *insert*:—The channel about one mile eastward of Ceram Laotet has a least depth of 6½ fathoms (11^m4) near its northern end, and a least width of about 4 cables; it is unmarked. A narrow passage on its western side, about half a mile north-eastward of Marlau, leads into a large lagoon.

Page 145.—Line 2: *For* "exhibited" *read* "occasionally exhibited"

[Lines 4-7: *Delete* and *substitute*:—

"The fairway is marked by beacons,"**]**

Line 8: *Add*:—The beacons on the western side of the channel are painted black, those on the eastern side are painted white.

Line 18: *For* "small mole" *read* "stone mole, 246 feet (75^m0) in length,"

After line 26 *insert*:—

Vessels should approach the roadstead against the tidal stream.

Line 29: *Delete* "southernmost"

Line 34: *Add*:—The ball beacon, mentioned above, is sometimes difficult to identify.

After line 39 *insert*:—

The beacon, surmounted by a black truncated cone, which stands at the north-eastern extremity of the reef extending northward from Geser, is very difficult to see when approaching from eastward.

Page 148.—Line 34: *Add*:—There is a drying reef about three-quarters of a mile northward of the 6-foot (1^m8) patch.

Page 151.—Line 27: *Add*:—A shoal, with a depth of 23 feet (7^m0) over it, was reported, in 1952, to lie about one mile northward of the north-western extremity of Doe Rowa; its position is approximate.

Line 47: *Delete* “ , each ” to “ cone,”

Line 50: *Add*:—

Vessels should keep 2½ cables southward of these beacons.

Page 152.—Lines 7-8: *For* “ above water ” *read* “ which dries ”

Lines 29-30: *Delete and substitute*:—

“ a spar buoy at its northern end and by a beacon, _____ situated about 2 cables within its southern end. In 1952, the spar buoy was reported to be missing.”

Lines 36-38: *Delete* “ The ” to “ beacon.” and *substitute*:—There is a small pier.

Line 41: *Add*:—In January, 1946, the village was in ruins.

Page 156.—*After* line 11 *insert*:—

The coasts of Noehoe Tjoet are particularly subject to violent squalls, known as Valwinden, which sweep down from the mountains on to the east coast during the north-west monsoon and on to the west coast during the south-east monsoon. These squalls are dangerous to small craft and call for vigilance in larger vessels, especially when at anchor.

On the east coast Valwinden are particularly strong in the vicinity of Fakoi, near the centre of that coast; on the west coast they are strongest at the southern end of the island, between Nerong and Fer.

Page 157.—Lines 16-19: *Delete* “ A white ” to “ cone,” and *substitute* “ A 13-foot (4^m0) patch is situated about 6 cables north-westward of the northern extremity of Sfat. A beacon ”

Page 161.—*After* line 38 *insert*:—

Off-lying danger.—A shoal was reported, in 1945, in Lat. 5° 17' S., Long. 134° 45' E., about 6½ miles north-eastward of the outer of the Djedan eilanden.

Page 162.—Line 12: *For* “ A bank ” *read* “ Java bank ”

Page 163.—Line 4: *For* “ exhibited ” *read* “ occasionally exhibited ”

Line 5: *Delete* “ A white ” to “ moored ” and *substitute*:—

“ A submerged pile, marked by a white conical buoy, is situated ”

Lines 10-11: *Delete*.

Line 37: *Delete and substitute*:—

In 1946, the town of Dobo no longer existed as such, all permanent buildings had been destroyed or were beyond repair; there were no harbour facilities except the pier which was in a state of bad repair.

Line 44: *After* “ Fanadjoering.” *insert*:—A shoal was reported, in 1953, to lie about 2½ miles west-north-westward of Tanjong Toardefete; its position is approximate.

Page 164.—*After* line 48 *insert*:—

Anchorage may be obtained, in a depth of 11 fathoms (20^m1), about three-quarters of a mile eastward of the jetty on the western side of

Page 164 continued.

the bay situated about a mile eastward of Tanjong Fatoedjoering. The bay is entered with the eastern end of Babi bearing 000°, astern, and a rock at the head of the bay bearing 180°, ahead; when the white house on the jetty bears 258° steer for it on that bearing, and anchor when Tanjong Fatoedjoering bears 323°. There is a reef off the western side of the bay, about a mile south-south-eastward of Tanjong Fatoedjoering, which is marked by an unofficial beacon. A shoal, with a depth of 11 feet (3^m4) over it, lies about 1½ miles north-westward of Tanjong Fatoedjoering.

Page 165.—*After line 40 insert:—*

Chart 3243.

A shoal, with a depth of 15 feet (4^m6) over it, lies about 36 miles west-north-westward of Tanjong Lelar.

Chart 470.

Page 168.—*Lines 25-33: Delete “ By keeping ” to “ wider.” and substitute:—*

“ Beyond the anchorage mentioned above local knowledge is necessary for navigating the channel, which, in places, is only about three-quarters of a cable in width; it has a least depth of 14 feet (4^m3).”

Page 169.—*Line 16: For “ 3¼ fathoms (5^m9) ” read “ 2 feet (0^m6) ”*

Page 171.—*Line 51: Delete “ and ” to “ lies ” and substitute “ and Banda reef, a 3-fathom (5^m5) patch, lies ”*

Page 172.—*Line 51: Delete and substitute:—*

Charts 942a and 3244.

Page 173.—*Line 1: Delete and substitute:—*

Chart 3244.

*Lines 4, 6 and 26: For “ Tanjong Sewirawa ” read “ Ponta Sevi-
vara ”*

Line 5: Delete and substitute:—

“ Jaco, a flat, uninhabited island, 263 feet (80^m2) high, with ”

Line 8: For “ Jako, between Jako ” read “ Jaco, between Jaco ”

Line 15: Delete and substitute:—

Charts 3244 and 3245.

Line 24: Delete and substitute:—

Chart 3244.

Line 28: Delete “ (Nyata) ”

Line 31: For “ 1,033 feet (314^m9) ” read “ 1,031 feet (314^m3) ”

Line 39: For “ 5 fathoms (9^m1) ” read “ 4¾ fathoms (8^m7) ”

Page 174.—*Lines 1 and 31: Delete and substitute:—*

Chart 3244.

Line 2: Delete “ (Swan) ”

After line 13 insert:—

The summit of the island, 2,449 feet (746^m4) high, is near the western side about 2¾ miles southward of the northern extremity of the island.

Lines 28-29: Delete “ the mouth ” to “ 338°, and ”

Line 30: For “ 086° ” read “ bearing 086° ”

Page 174 continued.

- Line 40: For " 305 feet (93^{m0}) " read " 303 feet (92^{m4}) "
 Line 45: Add:—Tellang is 618 feet (188^{m3}) high.
 Line 46: After " Laoet," insert " 181 feet (55^{m2}) high,"
 Line 47: After " Kital," insert " 213 feet (64^{m9}) high and "
 Line 53: For " 1,017 feet (310^{m0}) " read " 1,015 feet (309^{m4}) "

Page 175.—Line 1: *Delete and substitute:—*

Chart 3244.

- Line 7: *Delete* " (Juha) "
 Line 9: After " navigate." insert:—There are two small islets, covered in vegetation, on the reef off the south-eastern end of Djoeha, which are easy to distinguish.
 Line 13: After " islet " insert " , covered in vegetation,"
 Line 15: *Delete* the number against this line.
 Line 16: *Number* this line " 15 "
 Line 16: *Delete and substitute:—*

Charts 3244 and 3245.

- Line 18: *Delete* " (Teun) "
 Line 21: *Delete.*
 Line 22: For " north- " read " east-north- "
 Line 25: For " 2,848 feet (868^{m1}) " read " 2,846 feet (867^{m5}) "
 Lines 27-28: For " 1,529 feet (466^{m0}) " read " 1,527 feet (465^{m4}) "
 Line 38: *Delete* " (Kumur) "

Page 176.—Line 8: *Delete and substitute:—*

Charts 3244 and 3245.

- Lines 9-11: *Delete* " (Lat." to " (121^{m9}) " and *substitute:—*
 " (Lat. 7° 18' S., Long. 128° 34' E.), 464 feet (141^{m4}) high, and Zuid Terbang, 398 feet (121^{m3}) "
 Line 16: For " 1,529-foot (466^{m0}) " read " 1,527-foot (465^{m4}) "
 Line 20: *Delete and substitute:—*

" Chart 3244.

- Noes Leoer are two islets, 149 and 96 feet (45^{m4} and 29^{m3}) "
 Line 23: *Delete and substitute:—*

Charts 3244 and 3245.

- Line 24: *Delete* " (Teun) "
 Line 26: For " 2,149 feet (655^{m0}) " read " 2,147 feet (654^{m4}) "
 Line 29: *Delete* " (Layoni) "
 Line 35: *Delete and substitute:—*

Charts 3243 and 3245.

- Line 37: For " 2,559 feet (780^{m0}) " read " 2,560 feet (780^{m3}) "

Page 177.—Lines 1 and 30: *Delete and substitute:—*

Charts 3243 and 3245.

- Line 43: *Delete and substitute:—*

Chart 3244.

- Line 45: For " Tanjong Sewirawa " read " Ponta Sevivara "
 Line 46: For " 787 feet (239^{m9}) " read " 785 feet (239^{m3}) "
 Line 51: For " Wonréli " read " Wanréli "

Page 178.—Line 1: *Delete and substitute:—*

Chart 3244.

- Lines 6 and 14: For " Wonréli " read " Wanréli "

Page 178 continued.

Line 20: For "8° 04' S., Long. 127° 10' " read "8° 03' S., Long. 127° 13' "

Line 25: For "165 feet (50^m3) " read "160 feet (49^m8) "

Line 28: For "1,332 feet (406^m0) " read "1,330 feet (405^m4) "

Line 45: Delete "(Tutukai) "

Page 179.—Line 1: Delete and substitute:—

Chart 3244.

Line 23: For "948 feet (289^m0) " read "946 feet (288^m4) "

Line 24: For "725 feet (221^m0) " read "723 feet (220^m4) "

Line 26: Delete "(Karbau) "

Lines 26-27: For "1,230 feet (375^m0) " read "1,228 feet (374^m4) "

Page 180.—Line 1: Delete and substitute:—

Chart 3244.

Line 9: Delete and substitute:—

Charts 3244 and 3245.

Line 13: Delete.

Line 44: Delete "(Luang) "

Lines 44-45: For "853 feet (260^m0) " read "851 feet (259^m4) "

Line 47: Delete "(Metutun) "

Lines 53-54: For "5 fathoms (9^m1) " read "6 fathoms (11^m0) "

Page 181.—Line 1: Delete and substitute:—

Charts 3244 and 3245.

Line 6: For "is a conspicuous wood " read "are some conspicuous trees "

After line 7 insert:—

About 1½ miles north-westward of the conspicuous trees is a 1,284-foot (391^m4) summit and about a mile eastward of the western extremity of the island is a 1,212-foot (369^m4) summit.

Line 15: Delete and substitute:—

Chart 3245.

Line 17: For "2,710 feet (826^m0) " read "2,708 feet (825^m4) "

Line 21: For "1,145 feet (349^m0) " read "1,143 feet (348^m4) "

Lines 44-45: Delete "marked " to "buoy,"

Page 182.—Line 7: Delete and substitute:—

Chart 3245.

Line 30: Delete "(Manuwui) "

Line 34: After "island," insert "651 feet (198^m4) high,"

Line 44: For "942b " read "3245 "

Lines 47-48: Delete "1,096 " to "(292^m9) " and substitute:—
"1,094 feet (333^m5) high, and Daweloor, 959 feet (292^m3) "

Lines 51-52: For "northward of Dawera " read "southward of Dawera and within about 6 cables of the western extremity of Daweloor "

Page 183.—Line 1: For "942b " read "and 3245 "

Lines 11 and 37: Delete and substitute:—

Chart 3245.

Lines 12-13: For "2,136 feet (651^m0) " read "2,134 feet (650^m4) "

Page 183 continued.

Line 25: For " Kekeh Besar and Kekeh Keehill " read " Kekeh Besar, 633 feet (192^m9) high, and Kekeh Kechil "

Line 40: Delete " (Yamdena) "

Page 184.—Line 1: Delete and substitute:—

Chart 3245.

Line 14: For " , 942b " read " and 3245 "

Line 40: Delete and substitute:—

Chart 3245.

Line 41: Delete " (Wayangan) "

Page 185.—Line 1: Delete and substitute:—

Chart 3245.

Line 8: Delete " (Nus) "

After line 21 insert:—

A 19-foot (5^m8) coral patch lies near the fairway of the channel between Frinoen and Farnoesan and about 1 $\frac{3}{4}$ miles south-south-eastward of Frinoen.

Line 23: Delete " 495 " to " 128^m0 " and substitute " 493 and 418 feet (150^m4 and 127^m4) "

After line 28 insert:—

Depths of 6 fathoms (11^m0), or less, extend for over a mile westward and south-westward of the southern extremity of Namwaan, and depths of 10 fathoms (18^m3), or less, extend about 2 miles farther south-westward.

Line 45: For " 1,283 feet (391^m1) " read " 1,281 feet (390^m5) "

Lines 51-52: For " (Ungar) and Laibobar " read " and Laibobar, in which there is a depth of 4 $\frac{1}{2}$ fathoms (7^m8) "

Page 186.—Line 1: Delete and substitute:—

Chart 3245.

After line 10 insert:—

Shoals, with depths of 1 $\frac{1}{2}$, 3 $\frac{1}{2}$ and 4 $\frac{1}{2}$ fathoms (3^m2, 6^m9 and 7^m8) over them, lie about three-quarters of a mile north-north-westward, 1 $\frac{1}{2}$ miles north-westward and one mile westward, respectively, of the northern extremity of Voelmali.

Lines 11-12: Delete " (Yam-dena) "

Lines 18-19: For " 620 feet (189^m0) " read " 618 feet (188^m4) "

Line 23: Delete " (Wuliaru) "

Line 24: For " 617 feet (188^m0) " read " 615 feet (187^m4) "

Line 28: For " Dawah, 692 feet (210^m9) " read " Jawah, 690 feet (210^m3) "

Line 30: For " 249 feet (75^m9) " read " 247 feet (75^m3) "

Line 34: For " 341 feet (103^m9) " read " 339 feet (103^m3) "

Lines 40-41: Delete " A 2 $\frac{3}{4}$ " to " Keswoe. " and substitute:—

The last mentioned reef lies on a bank, with depths of 3 fathoms (5^m5), or less, over it, extending about 3 miles westward from the southern extremity of Woeliaroe.

Line 47: Delete " from " to " Keswoe " and substitute " about 4 $\frac{1}{2}$ and 5 miles west-south-westward of the south-western extremity of Keswoe, and a one-fathom (1^m8) patch lies about 6 miles westward of the same point "

Page 187.—Line 1: *Delete and substitute:—*

Chart 3245.

After line 16 insert:—

Two $5\frac{1}{2}$ -fathom (10^m1) patches lie about $8\frac{1}{2}$ miles south-eastward and $6\frac{1}{2}$ miles south-south-eastward of the eastern extremity of Bara Sadi; two 6-fathom (11^m0) patches lie about $5\frac{1}{2}$ and $7\frac{1}{2}$ miles southward of the same point.

A depth of $7\frac{1}{2}$ fathoms (13^m7), with deep water around, lies about 9 miles southward of Bara Sadi.

Lines 28-29: *Delete "236" to "(52^m1)" and substitute:—*

"234 feet (71^m3) high, and Natraal eilandje, 169 feet (51^m5)"

After line 30 insert:—

A $3\frac{3}{4}$ -fathom (6^m9) patch lies about half a mile south-eastward of the south-eastern extremity of Jarngoer Raa and Natraal; foul ground extends a short distance north-eastward from the north-eastern extremity of Jarngoer Raa.

Page 188.—Lines 1, 31 and 44: *Delete and substitute:—*

Chart 3245.

After line 3 insert:—

Coast.—Between the southern entrance point to Baai van Salwassa and Noes Kei, about 12 miles southward, the western coast of Jamdena is much indented, low and covered with mangroves; it is fronted by broad drying reefs, on which there are several low islands, and there are many isolated dangers. Between Noes Kei and Latdalam village about 4 miles south-south-eastward, the shore is rocky and fringed with dense timber; southward of Latdalam there is a good beach beyond which the coast is high and cliffy, with small sandy beaches in the coves, as far as Tanjong Djasi the south-western extremity of Jamdena, about $3\frac{1}{2}$ miles southward of the village.

Lines 21-23: *Delete "The zinc roof" to "approach."*

Line 26: *After "bay" insert"; there is a depth of 16 feet (4^m9) alongside the head of the pier"*

After line 27 insert:—

In January, 1946, none of the original buildings in the town remained; the church was merely a shell.

Line 32: *After "Selaroe.—" insert "Dangers.—"*

Lines 41-43: *Delete "The channel" to "dangers." and substitute "A shoal, with a depth of 26 feet (7^m9) over it, lies in the north-western approach to the roadstead about a mile south-eastward of Noejanat."*

After line 51 insert:—

A $4\frac{1}{2}$ -fathom (7^m8) patch and a $4\frac{3}{4}$ -fathom (8^m7) patch lie in the western approach to Labuan Olendir about $7\frac{1}{2}$ and 9 miles, respectively, west-north-westward of Tanjong Wadatoetoe; another $4\frac{3}{4}$ -fathom (8^m7) patch lies about $9\frac{1}{2}$ miles westward of the same point.

A $4\frac{3}{4}$ -fathom (8^m7) coral patch lies about $8\frac{1}{2}$ miles west-south-westward of Tanjong Aro Oesoe, the south-western point of Selaroe.

A $5\frac{1}{2}$ -fathom (10^m1) patch lies about 3 miles eastward of the south-eastern extremity of Selaroe.

Two $4\frac{3}{4}$ -fathom (8^m7) patches lie about 10 miles eastward and $13\frac{1}{2}$ miles east-north-eastward of the south-eastern extremity of Selaroe.

A ridge, with depths of from $4\frac{3}{4}$ to $8\frac{1}{2}$ fathoms (8^m7 to 15^m5) over it, extends parallel with the south-eastern side of Selaroe between

Page 188 continued.

positions about 6 miles south-south-eastward and 10 miles south-south-westward of the north-eastern extremity of the island.

Page 189.—Line 1: *Delete and substitute:—*

Chart 3245.

Line 5: *Delete* " (Ato Usu) "

Line 12: *For* " $131^{\circ} 47'$ " *read* " $131^{\circ} 46'$ "

Line 17: *After* " Vatoelmaa " *insert* " (Vat oelmaa) "

After line 21 *insert:—*

Anchorage may be obtained during the north-west monsoon by vessels with local knowledge off several of the villages between Watmoeri (page 190) and Toember about 33 miles southward.

Line 37: *Delete* " , surmounted " to " ball, "

Page 190.—Line 1: *Delete and substitute:—*

Chart 3245.

Line 3: *For* " Orafroen " *read* " Orafroean "

Line 13: *Delete* " (Nu ka ha) "

Line 14: *For* " 128 feet (39^{m0}) " *read* " 126 feet (38^{m4}) "

After line 17 *insert:—*

Two shoals, with depths of less than $4\frac{1}{2}$ fathoms (7^{m8}) over them, were reported, in 1949, to lie on a reef and within a radius of $1\frac{1}{2}$ miles of a position about 6 miles eastward of the northern extremity of Fordate.

Line 23: *After* " Karmoeta " *insert* " ; there is a depth of $5\frac{1}{2}$ fathoms (10^{m1}) between the reefs "

Line 27: *After* " dries " *insert* " , on the southern end of which is an islet, 14 feet (4^{m3}) high; between Sari Watoeroe and Sari Kilmasa there are also a number of reefs, with depths of from one fathom to $4\frac{1}{2}$ fathoms (1^{m8} to 7^{m8}) over them, the positions of which can best be seen on the chart "

Line 40: *For* " close offshore " *read* " at a distance of about $1\frac{1}{2}$ miles offshore "

Line 42: *Delete* " (Alusi) "

Line 44: *Add:—*A $6\frac{1}{2}$ -fathom (11^{m9}) coral patch, about $2\frac{1}{2}$ miles eastward of Aloesi, should be avoided.

Line 46: *For* " northward of the islet " *read* " about 4 miles northward of the islets of Kore and "

Page 191.—Line 1: *Delete and substitute:—*

Chart 3245.

Line 6: *Delete* " (Asutubun) "

Page 192.—Line 12: *Delete and substitute:—*

Charts 942b and 3246.

Lines 17-19: *Delete* " 5 " to " end " and *substitute:—*

" $5\frac{1}{2}$ fathoms (10^{m1}) over it, lies in the south-western part of the area about 36 miles westward of the shoalest part "

After line 19 *insert:—*

A shoal area, which had not been examined, in 1945, lies about 110 miles westward of Le Cher bank, and about 90 miles southward of Enoe, the southernmost of the Aroe eilanden.

Page 193.—Line 7: *Delete and substitute:—*
Chart 3248.

Line 11: *Delete* " (Sayang) "

Line 24: *Delete* " 7 " to " 18 miles," and *substitute* " $7\frac{1}{2}$ fathoms (13^m7), lie about 18 miles "

After line 27 insert:—

The reef, reported in 1945, to lie about 13 $\frac{1}{2}$ miles north-eastward of Jiew island is described on page 81

Line 28: *Delete* " (Wayag) "

Line 32: *Delete* " (Kwoi) "

Page 194.—Lines 1 and 25: *Delete and substitute:—*
Chart 3248.

Line 23: *After* " southward " *insert* " , and the island of Beo lies about 2 $\frac{1}{2}$ miles eastward, "]

Line 40: *Delete* " (Ayu) "

Line 43: *Delete* " (Ur) "

Line 46: *Delete* " (Mios Kuan) "

Page 195.—Line 1: *Delete and substitute:—*
Chart 3248.

Line 5: *For* " 292 feet (89^m0) " *read* " 293 feet (89^m3) "

Line 11: *For* " 1 $\frac{1}{4}$ " *read* " 1 $\frac{3}{4}$ "

Line 13: *Add:—*Awirisi, a group of above-water rocks, lies on the northern end of the reef about 1 $\frac{3}{4}$ miles east-north-eastward of Mios Mandoeng.

Page 196.—*After line 15 insert:—*

To pass through the northern channel into the inner part of the bay a vessel should bring a high bell-shaped islet on the northern side of the passage, ahead, bearing 095°, and keep it so until the north-eastern extremity of the island on the southern side of the passage bears 135°, when course should be altered sharply for that extremity and held, for about half a cable, until in mid-channel; course should then again be altered sharply to 104° for the inner bay. The least depth on this track is about 11 fathoms (20^m1). A strong tidal stream may be encountered in the passage.

Line 18: *Add:—*A vessel should keep in the centre of the channel until approaching its eastern end, when she should keep towards the northern side, passing northward of several small rocks off the southern shore; the channel, here, is little more than 2 cables wide but the water is deep. A strong stream may be encountered in this passage also.

The northern inner bay may be entered through a deep, clear channel a little more than 2 cables in width.

The outer part of the bay affords anchorage in depths of from 23 to 30 fathoms (42^m1 to 54^m9). The inner part of the bay and the bay northward of it afford excellent anchorage, in depths of from 14 to 18 fathoms (25^m6 to 32^m9).

Line 19: *Delete* " 4 $\frac{1}{4}$ " to " 2 " and *substitute* " about 2 $\frac{1}{2}$ fathoms (4^m6) over it, lies about 3 "]

Line 48: *After* " Pele " *insert* " ; a drying reef extends about 1 $\frac{1}{2}$ cables northward from the northern side of this island "

Page 197.—[Line 31: For “bay” read “baai”]

After line 40 insert:—

There is a village on the western side of the bay about half a mile southward of the western entrance point; there is another at the head of a small inlet on the eastern side of the bay about $1\frac{1}{2}$ miles south-south-eastward of the eastern entrance point.

[Line 51: For “harbour” read “baai”]

Page 198.—[Line 20: Delete “Lawak” to “bays” and substitute “Kabarei baai and Lawak channel”]

[Line 32: For “Boni harbour” read “Channels near Boni”]

After line 47 insert:—

There is a village on the coast about half a mile south-south-eastward of the extremity of Tanjong Wariai.

Page 199.—Line 43:—

[Page 200.—Line 3: Delete “There” to “Fam”]

[Line 12: For “Two” read “A shoal with a depth of about 6 fathoms (11^m0) over it, lies about $2\frac{1}{2}$ miles north-north-westward, two”]

[Line 29: After “high.” insert:—Mansoeur village stands about half a mile westward of the eastern peak.]

[Line 31: After “Mansoeur.” insert:—The village of Janboeda stands at the western end of Kri.]

[Line 46: After “village” insert “named Swingkrai.”]

Page 201.—[Line 13: For “Saonek anchorage” read “Rede Saonek”]

[Line 21: For “12 feet (3^m7)” read “11 feet (3^m4)”]

Lines 47-49: Delete “The bay” to “vessels,” and substitute:—

A rock, with a depth of 5 feet (1^m5) over it, lies about 2 cables offshore on the eastern side of the entrance and about one mile eastward of the western entrance point.

The bay is entered through a narrow strait, about 5 miles in length, with high sides, in which the tidal streams attain a rate of about 5 knots, in places, at springs; eddies form, with counter-currents along the shore. These conditions and a sharp turn in the northern part of the strait, together with the tidal stream disturbance caused by Manil, an island about one mile westward of the sharp turn, limit navigation to vessels of not more than 300 feet (91^m4) in length. Vessels are advised to await slack water before entering. There is a scoured channel through the strait, with a reported least depth of 6 fathoms (11^m0), and general depths of 8 fathoms (14^m5) and over. After passing through the strait, Majalibit baai proper is entered, where, it is reported, there are no navigational difficulties, and that the bay shoals very gradually to the head.

The general directions given below should be of assistance in following the scoured channel through the strait.

A mid-channel course, of about 308°, should be steered for the first mile of the strait; then, the point on the eastern side of the channel, about 2 miles north-westward, should be brought into line with the point beyond it on the opposite side of the channel, bearing 330°, and kept in line for another mile, after which the western shore should be followed at a distance of about one cable until the point on

Page 201 continued.

the eastern side is abeam. A mid-channel course should then be held for about half a mile to, and through, the narrows, which are less than $1\frac{1}{2}$ cables wide, and where the strait turns abruptly westward. Having passed the narrows the channel is clear of shoals to Manil island which should be passed on its northern side. When leaving the bay, owing to the tidal stream disturbance in its vicinity, Manil island should be passed on its southern side.

Page 202.—Line 15: After “Dangers.—” insert “ A [2]-fathom [(3^m7)] patch lies about 3 miles eastward of Saonek Besar.”

Page 203.—Line 35: After “ SAGEWIN.— ” insert “ **Light.—** ”
After line 43 insert:—

A light is exhibited, at an elevation of 347 feet (105^m8), from a white iron framework tower, 33 feet (10^m1) in height, on the northern side of the strait about $13\frac{1}{2}$ miles eastward of Tanjong Mabo.

[Page 204.—Line 8: Delete and substitute:—
“ settlement of any importance.

Chart 1416.

Jef Doit or Snapan, an islet ”]

[Line 9: For “ 558 feet (170^m1) ” read “ 555 feet (169^m2) ”]

[After line 13 insert:—

Chart 3745.]

[Page 205.—Line 2: For “ (Yef) Danya ” read “ Danja ”]

[Line 12: Delete “ (Chun) ”]

[Line 18: Delete “ (Umien) ”]

[Line 21: Delete “ (Nusela) ”]

[Line 30: For “ reef ” read “ shoal ”]

Line 48: For “ Doom and Matan,” read “ four ”

Page 206.—Line 6: [Delete and substitute:—
“ Jef Kasim.”]

Line 34: Delete and substitute:—

“ Samate village consists of ”

After line 35 insert:—

There is a T-headed pier on the south-eastern side of Efman; in 1950 there were depths of 7 and 12 feet (2^m1 and 3^m7) alongside the northern and southern ends of its head, respectively.

[Chart 1416 and plan of Rede Sorong.]

Line 36: For “ **Light.—Beacon.—** ” read “ **Lights.—Beacons.—** ”
Dangers.—Buoyage.—Pilotage.— ”

Line 39: For “ (Dom), an islet ” read “ , an islet 126 feet (38^m4) high,”

Line 41: Delete “ (Nuyew) ”

Lines 41-42: Delete “ is ” to “ pier ” and substitute “ are two piers ”

Lines 43-46: Delete and substitute:—

In 1951 the population was reported to be between two and three thousand natives and from two to three hundred Europeans, the latter being mostly employed by an oil company.

There is a Harbour Master.

Page 206 continued.

The limits of the roadstead are the parallels of Lat. $0^{\circ} 50'$ and Lat. $0^{\circ} 58'$ S. and the meridian of Long. $131^{\circ} 11'$ E., and are indicated on the chart.

In 1949, Pilotage waters were limited to the roadstead; but vessels arriving at night may anchor, till next morning, northward of the leading line, west-north-westward of Tanjong Noejew to await the arrival of a pilot.

Line 47: After "island," insert "214 feet (65^m2) high,"

Line 53: After "island" insert " , 175 feet (53^m3) high,"

Page 207.—[Line 1: For "Chart 1416." read "Chart 1416 and plan of Rede Sorong."]

Line 2: For "4" read " $2\frac{1}{2}$ "

Line 3: Add:—The north-eastern of these reefs, with a depth of 11 feet (3^m4) over it, situated about 8 cables north-westward of the northern extremity of Tsiof, is marked by a [spherical] light-buoy, exhibiting a green flashing light showing a short flash every five seconds [and the centre reef, with a depth of 3 feet (0^m9) over it, is marked by a red conical buoy.]

A detached 5-foot (1^m5) patch lies about half a mile east-north-eastward of the northern end of Tsiof.

Two [rocks awash], lie about $3\frac{1}{2}$ cables south-eastward and 4 cables south-south-eastward of the northern extremity of Tsiof and about $2\frac{1}{2}$ and $1\frac{1}{2}$ cables offshore.

The channel, nearly $1\frac{1}{2}$ miles wide, between Tsiof and Nanah, an island lying about $8\frac{1}{2}$ cables southward of Doom, is encumbered with scattered dangers, the positions of which may best be seen on the chart; the same remarks apply to the channel between Nanah and Doom; neither channel should be attempted without local knowledge.

Lines 4-9: Delete and substitute:—

A light is exhibited, at an elevation of 98 feet (29^m9), from a white iron framework structure, 49 feet (14^m9) in height, on Tanjong Sorong.

A light is exhibited, at an elevation of 36 feet (11^m0), from a white iron framework structure, 33 feet (10^m1) in height, on the south-western end of Tsiof.

A light is exhibited, at an elevation of 33 feet (10^m1), from a white iron framework structure, 16 feet (4^m9) in height, on Dopior, an islet lying on the edge of the coastal reef about $1\frac{1}{4}$ cables westward of Tanjong Noejew.

A light is exhibited on the northern side of Doom.

Leading lights are exhibited east-south-eastward of Tanjong Noejew; the front light from a white iron framework structure, 16 feet (4^m9) in height, standing on the edge of the shore reef about $1\frac{1}{4}$ miles east-south-eastward of Tanjong Noejew; the rear light, at an elevation of 196 feet (59^m7), from a beacon surmounted by a white diamond, situated about $2\frac{1}{4}$ miles east-south-eastward of Tanjong Noejew. A conspicuous tree, carrying a white triangular daymark, stands close to the rear light beacon.

Two shoals, with depths of 20 and 13 feet (6^m1 and 4^m0) over them, lie respectively, about 3 cables eastward and $8\frac{1}{2}$ cables east-north-eastward of the light-structure on Doom [and a 3-fathom (5^m5) depth lies nearly half a mile westward of the light-structure.]

No vessel should attempt to pass between Tanjong Noejew and Dopior; the passage has been partially blocked.

A reef, which dries, lies about half a mile southward of the front leading light-structure described above. A beacon, surmounted by a cylinder, marks the western edge of the reef.

Shoals, with depths of 5 and 7 feet (1^m5 and 2^m1) over them, lie about 8 and 10 cables south-south-eastward, and a patch, with a depth of one foot (0^m3), lies about $3\frac{1}{2}$ cables south-eastward of the front leading light-structure.

Moe, an islet, lies about 9 cables south-eastward of Nanah at the north-western end of a large reef which extends about $1\frac{1}{2}$ miles southward and on which also lie the islands of Vandoe and Ombree, south-eastward.

The southern entrance channel to Rede Sorong lies between Moe and Nanah and the dangers off them.

A small detached reef, lying about $1\frac{1}{2}$ miles south-westward of Moe constitutes the outer danger on the eastern side of the entrance channel. A beacon, surmounted by a white cylinder, standing on a one-foot (0^m3) patch, marks the eastern edge of the channel nearly half a mile west-south-westward of Moe; from the beacon the channel is fringed, southward, by a drying reef and north-eastward by a chain of shoal heads and reefs for a distance of about one mile. A shoal, with depths of from 16 to 18 feet (4^m9 to 5^m5), lies about three-quarters of a mile north-north-eastward of Moe, with foul ground about 2 and $4\frac{1}{2}$ cables south-eastward of it.

Foul ground, with depths of less than 6 feet (1^m8), extends about $2\frac{1}{2}$ cables south-eastward and southward, and a shoal, with a least depth of 24 feet (7^m3) over it, lies about $2\frac{1}{2}$ cables south-south-eastward, of the southern extremity of Nanah; a [rock awash] and a 9-foot (2^m7) shoal lie about $3\frac{1}{2}$ and $5\frac{1}{2}$ cables south-south-westward of the same extremity and are the outer dangers on the western side of the southern entrance; a drying reef extends about $3\frac{1}{2}$ cables south-westward from the southern end of Nanah.

A beacon surmounted by a black cylinder stands at the edge of the fringing reef off the south-eastern side of Nanah, and marks the western side of the southern entrance channel.

A shoal, with a swept depth of 21 feet (6^m4) over it, lies in mid-channel about 5 cables eastward of the southern extremity of Nanah.

Two shoals, with depths of 14 and 23 feet (4^m3 and 7^m0) over them, lie on the southern side of the usual anchorage in Rede Sorong, and about $7\frac{1}{2}$ cables east-north-eastward and $1\frac{1}{2}$ miles eastward of the northern extremity of Nanah; they have been swept to depths of 14 and 21 feet (4^m3 and 6^m4) respectively.

Eastward of Tanjong Noejew there are several piers and a wharf, about 400 feet (121^m9) in length, with a depth alongside of not less than 25 feet (7^m6); an oiling pier, with a depth of 30 feet (9^m1) alongside, where vessels berth at dolphins, and where fresh water and fuel oil may be obtained, lies about half a mile eastward of Tanjong Noejew.

There are a number of mooring buoys in the vicinity of the oiling pier and in the north-eastern part of the road.

There is a small pier, with a mooring buoy close off it, at the eastern end of Karim, an islet which, with Toen an islet close south-eastward, lies about $1\frac{1}{2}$ miles north-eastward of Moe.

Line 15: *Add*:—During September, 1947, the maximum rate of the tidal streams was about one knot.

Page 207 continued.

Lines 16-21: *Delete and substitute:—*

A vessel approaching Reede Sorong from northward should pass westward of the black rocks lying westward of Ram, and, thence, steer to bring the leading lights, east-south-eastward of Tanjong Noejew, into line, bearing $102\frac{1}{2}^{\circ}$, passing northward of the 11-foot (3^m4) patch northward of Tsiof; keep the lights in line until the light-structure on the northern side of Doom bears 125° , ————— when she should haul slightly southward of the leading line and pass between Dopior and Doom; when the light-structure on the northern side of Doom bears 235° , ————— course should be altered as necessary for the anchorage, passing between the 13- and [20-foot] (4^m0 and [6 m1]) shoals east-north-eastward of the head of the pier at Doom.

A vessel approaching from southward should steer to bring the front leading light-structure, bearing 033° , which leads through the southern entrance to the anchorage. It should be noted that this leading line passes close north-westward of [the 21-foot] (6^m4) patch about half a mile eastward of the [southern] extremity of Nanah.

Radio station.—Signal station.—There is a radio station on Doom. There is a signal station on Tanjong Noejew.

Harbour facilities.—Fresh water and fuel oil are obtainable.

There is one 120-ton tug, and a number of motor launches.

There are two mobile 5-ton cranes on the wharf, and there is a 25-ton floating crane.

There is a privately owned floating dock with a lifting capacity of 600 tons.

There is a large hospital on the mainland eastward of Tanjong Noejew, maintained by an oil company.

[Line 22: For "Charts 1416" read "Chart"]

Lines 23-24: After "Dangers.—" insert "Lights.—"

[Line 26: After "south-westward" insert "with depths of 19 feet (5^m8) between them"]

Line 28: After "Sélé" insert ", two 3-fathom (5^m5) patches lie about $3\frac{1}{2}$ and 5 miles southward of that point; both patches have been swept over [] ; a 19-foot (5^m8) patch lies about 6 miles south-south-eastward of the point; other depths, of less than 5 fathoms (9^m1), lying in the vicinity can best be seen on the chart"]

After line 35 insert:—

A light is exhibited, at an elevation of 17 feet (5^m2), from a white iron framework structure on Membok.

Oempe light is described on page 211.

[Line 40: Delete "(Lugo)"]

After line 42 insert:—

A light is exhibited, at an elevation of 10 feet (3^m0), from a white structure, 8 feet (2^m4) in height, at Kampong Wiljam, on the western side of the strait about 9 miles north-north-eastward of Membok.

Anchorage may be obtained, in a depth of about 12 fathoms (21^m9), on the eastern side of Jef Kasim. It may be approached from northward or southward; an unofficial beacon marks a small drying reef lying near the mainland at the entrance to the southern approach channel. There is a pier at the settlement.

After line 48 insert:—

Straat Sele.—Lights.—Dangers.—Beacons.—Light-buoy.—A light is exhibited, at an elevation of 34 feet (10^m4), from a white column surmounted by a white inverted triangle, 33 feet (10^m1) in

height, situated on the western end of Kamoomjel, an island about 3 miles east-north-eastward of Tanjong Waifkalettet at the northern end of the eastern side of the narrows.

A light is exhibited, at an elevation of 10 feet (3^m0), from a white hut on a platform situated on a drying reef about 3 miles north-north-eastward of Kamoomjel light-structure. Shoals, with depths of [less than 5 fathoms (9^m1)] extend northward of this light-structure.

A light is exhibited, at an elevation of 11 feet (3^m4), from a white structure, surmounted by a triangle, situated on a reef which extends about 2 cables northward from Segarau, about 4 miles north-north-eastward of Kamoomjel light-structure. Shoals, with depths of [6] and 18 feet ([1^m8] and 5^m5) over them, lie about 5 cables east-north-eastward and $2\frac{1}{2}$ cables north-eastward, respectively, of this light-structure. Shoals, with depths of [23] and 25 feet (7^m0) and 7^m6 over them, lie close westward and eastward, respectively, of the leading line about $2\frac{3}{4}$ miles northward of this light-structure.

A light is exhibited, at an elevation of 54 feet (16^m5), from a white column surmounted by a red inverted triangle, 49 feet (14^m9) in height, situated on the reef close westward of Wolo Genan, an islet about $4\frac{1}{2}$ miles east-north-eastward of Segarau reef light-structure.

A light is exhibited, at an elevation of 19 feet (5^m8), from a white column surmounted by a white triangle, 16 feet (4^m9) in height, situated on the north-eastern extremity of Balbili and about $3\frac{1}{2}$ miles northward of Wolo Genan.

A light is exhibited, at an elevation of 11 feet (3^m4), from a white pillar, 8 feet (2^m4) in height, situated on the south-eastern point of Bolke, an islet, about one mile westward of Balbili light-structure.

Three shoals, with depths of from [13 to 24 feet (4^m0 to 7^m3)] over them, lie between 4 cables north-westward and 7 cables [northward] of Balbili light-structure.——— A shoal, with a depth of [30 feet (9^m1)] over it, lies about $3\frac{1}{2}$ cables north-eastward of the light-structure.

A beacon, surmounted by a white ball [marks a rock awash], about 3 miles north-north-eastward of Balbili light-structure. A 31-foot (9^m4) detached patch lies about $3\frac{1}{2}$ cables south-eastward of this beacon.

A reef, [with a depth of 7 feet (2^m1) over it,] is marked by a——— white conical light-buoy exhibiting a *white flashing light every five seconds*, which lies about 5 miles northward of Balbili light-structure.

Two shoals, each with a depth of 11 feet (3^m4) over it, lie about 2 miles south-eastward and south-south-eastward of Matan, and a 15-foot (4^m6) patch lies about 6 cables northward of Kasiem (page 208).

Line 49: For "After" read "Directions.—After"

[Line 51: Delete "(Yef)"]

[Line 52: Delete "(Salutun)"]

Line 54: After "of it" insert ", on which there is a light-structure"

Page 208.—Line 2: For "beacon at" read "light-structure near"

Line 3: For " $1\frac{1}{2}$ cables northward" read "2 cables northward; and westward of the [6-foot (1^m8)] patch about half a mile east-north-eastward of the light-structure"

Line 4: After "keep" insert "Kamoomjel and Segarau reef light-structures, or"

Page 208 continued.

Lines 6-12: *Delete* "bears 101°" to "dangers" and *substitute* "bears about 092°, when she should steer to pass southward and eastward of Balbili and then alter course northward; having avoided the shoal patches about one mile northward of Balbili light-structure, she should bring that light-structure into line with Wolo Genan light-structure, bearing 180°, astern, which leads clear of all dangers"

Line 14: *After* "Kabra" *insert* ", and westward of the [beacon] and the white light-buoy described above"

Lines 16-27: *Delete and substitute:—*

If bound for Reede Sorong, the vessel should continue with Balbili and Wolo Genan light-structures in line, astern, bearing 180°, until the summit of Malabiliniak, a hill 457 feet (139^{m3}) high, situated about 1½ miles eastward of Tanjong Noejew, bears 036°, when it should be kept on that bearing, which leads to the southern entrance to Reede Sorong.

Line 29: *For* "between" *read* "southward and eastward of"

Lines 37-38: *Delete* "16" to "3^{m4})" and *substitute* "11 feet (3^{m4})"

Line 39: *For* "the eastern" *read* "Balbili and Wolo Genan light-structures are in line, bearing 180°, or the eastern"

Line 42: *Delete and substitute:—*

Vessels with a draught of 16 feet (4^{m9}) or less, may pass between Balbili and Bolke, taking care to avoid the [13-foot (4^{m0})] shoal about 4 cables north-westward of Balbili light-structure.

After line 47 *insert:—*

The headquarters of the Rajah of Salawati are on Kasiem, an islet close off the north-eastern end of Warir, and about 6½ miles south-westward of the southern entrance to Reede Sorong.

Anchorage.—Anchorage may be obtained as convenient almost anywhere in the strait. Anchorage may be obtained by a vessel of moderate draught, with local knowledge, eastward of Makmak, an island, on the eastern side of the strait, about 2½ miles south-eastward of Balbili; the anchorage may be approached from northward or southward, but there are a number of dangers in both approaches, the positions of which may best be seen on the chart. Their is a pier here, on the mainland, and a mooring buoy in the anchorage.

[Page 209.—Line 25: *Delete.*]

[Line 40: *After* "Coast.—" *insert* "Light.—"]

Page 210.—Line 4: *For* "942b" *read* "3248"

Line 11: *Delete and substitute:—*

A drying reef extends about a quarter of a mile offshore about 1½ miles east-north-eastward of Tanjong Kasbi; three drying rocks lie about 1½ miles further east-north-eastward.

Chart 3248.

Line 15: *Delete* "(Mios Su)"

[Lines 23-26: *Delete and substitute:—*

A light is exhibited, at an elevation of 59 feet (18^{m0}), from an iron framework structure, 54 feet (16^{m5}) in height, which stands on Amsterdam.]

Sansapor Baroe and Weroer are two villages situated about 5½ and 7 miles east-north-eastward of Tanjong Sansapor; a flagstaff at Weroer, where fresh fruit is abundant, indicates the landing place.

Page 210 continued.

Line 31: After " on it." insert:—Depths of 3 fathoms (5^m5), or less, extend about 1½ miles north-north-eastward from Tanjong Opmarai.

Lines 40-41: For " 0° 20' S., Long. 132° 24' " read " 0° 21' S., Long. 132° 25' "

Line 47: After " Coast.— " insert " Light.— "

[Line 51: Delete " (Yamtup) "]

Page 211.—[Line 7: Delete " (Umpe) "]

[Line 9: Delete " (Yus) "]

After line 12 insert:—

A light is exhibited, at an elevation of 33 feet (10^m1), from a white iron structure, 32 feet (9^m8) in height, on the western extremity of Oempe.

Line 13: After " dangers.— " insert " Light.—A shoal, with a depth of 49 feet (14^m9) over it, the position of which is approximate, was reported, in 1951, about 15 miles south-westward of Tanjong Sélé (page 206).

[Line 17: Delete " (Yef Yus) "]

Line 22: After " Jef Joes." insert:—Two shoals, with depths of 10 and 11 feet (3^m0 and 3^m4) over them, lie, respectively, about 7 and 8½ miles north-westward of Jef Joes. A rock, with a depth of less than 6 feet (1^m8) over it, [lies] about 6½ miles north-north-westward of Jef Joes.

After line 23 insert:—

A light is exhibited, at an elevation of 30 feet (9^m1), from a red iron structure, 33 feet (10^m1) in height, on the north-eastern extremity of Jef Joes.

Line 26: For " are liable to change." read " are constantly changing. The Dutch Sailing Directions state that no reliance can be placed on charts of this locality that are more than one year old."

[Line 48: Delete " (Yef) "]

Page 212.—[Line 7: Delete " (Yef Yal) "]

Line 14: After " Coast.— " insert " Buoy.— "

Page 213.—[Line 8: For " Warongé " read " Waromge "]

[Line 9: Delete " (Rumoninpori) "]

Line 52: After " entrance." insert " in 1940, a white spherical buoy was moored in the estuary, about one mile southward of the mouth of the river. Vessels should pass eastward of the buoy.

Page 214.—Line 40: After " gulf.— " insert " Light.— "

After line 49 insert:—

A light is exhibited, at an elevation of 49 feet (14^m9), from a white iron framework structure, 49 feet (14^m9) in height, situated on Tanjong Sabra.

Page 216.—Line 46: For " 5 feet (1^m5) " read " 24 feet (7^m3) "

Page 217.—Line 29: After " Coast.— " insert " Light.— "

Page 218.—After line 12 insert:—

A light is exhibited, at an elevation of 160 feet (48^m8), close within Tanjong Tanah Merah.

Page 218 continued.

After line 48 insert:—

Close within the mouth of Sungei Moetoeri the tides are semi-diurnal; the in-going and out-going tidal streams, in the directions 070° and 250°, respectively, are equally strong, attaining a maximum rate of $1\frac{3}{4}$ knots at Springs and three-quarters of a knot at Neaps.

Line 49: After "shore.—" insert "Buoyage.—Beacons.—"

Page 219.—Lines 5-8: Delete ", a vessel" to "bank" and substitute "local knowledge is necessary"

Line 10: Delete "18" to "fairway" and substitute "12 feet (3^m7) on the bar, in 1951"

After line 12 insert:—

A spherical light-buoy, painted in red and black horizontal bands and exhibiting a *white flashing light every three seconds*, is moored in the estuary of the Wasian about $1\frac{1}{2}$ miles southward of the mouth of the river.

A beacon, surmounted by an appropriate topmark, stands on each bank of the Wasian about $1\frac{1}{2}$ miles within the entrance.

After line 16 insert:—

A white conical light-buoy, exhibiting a *white flashing light every seven seconds* is moored at the western end of the 5-fathom (9^m1) bank extending about $5\frac{1}{2}$ miles west-south-westward from Tanjong Kabarisi, situated about 7 miles south-eastward of the entrance to Sungei Wasian.

Lines 20-30: Delete "A" to "point." and substitute:—The entrance to Sungei Moetoeri is marked by a white conical buoy, surmounted by a ball, moored about $2\frac{1}{2}$ miles north-north-westward of Tanjong Kabarisi, and the first reach is marked on the north-western side by a black can buoy surmounted by a truncated cone and on the south-eastern side by a white conical buoy surmounted by a ball. A vessel approaching Sungei Moetoeri should pass northward of the white light-buoy about $5\frac{1}{2}$ miles west-south-westward of Tanjong Kabarisi, and westward of the white conical buoy surmounted by a ball in the entrance to the river.

There is an oil pier about 3 miles within the entrance, on the western bank of the river, with a depth of about 33 feet (10^m1) at its head; two dolphins stand northward and southward of the pier head.

The limits of the roadsteads of Steenkool, in Wasian river, and of Moetoeri are bounded by the parallel of Lat. 2° 17' 30" S. between the meridians of Long. 133° 29' and 133° 46' E. and by the coast northward.

Page 220.—Lines 16-20: Delete.

Lines 30-33: Delete "pier" to "Babo." and substitute "pier, suitable only for boats, is situated on the western side of Sungei Kasira. An L-shaped pier, with a depth of 26 feet (7^m9) alongside its head, is situated about three-quarters of a mile further northward."

Page 221.—Lines 13-14: Delete ", on" to "name,"

Page 222.—Line 12: After "dangers.—" insert "Light.—"

After line 24 insert:—

A light is exhibited, at an elevation of 260 feet (79^m3), from a white tower, 49 feet (14^m9) in height, on the north-eastern end of Saboeda.

Page 222 continued.

Line 43: *Add*:—A $6\frac{1}{2}$ -fathom (11^m9) shoal was reported in 1949, to lie about half a mile west-north-westward of the 16-foot (4^m9) patch.

Line 47: *Add*:—A detached reef, with a depth of $3\frac{1}{2}$ fathoms (6^m4) over it, lies off the head of Telok Sipatnam; it is parallel with the coast, from which it is separated by a deep channel, about one cable long and 33 yards (30^m2) wide.

Page 223.—Line 10: *Add*:—Between the reef and the mainland are numerous dangers, some of which are shown on the chart.

Line 23: *For* "A reef" *read* "Egeron reef"

Line 40: *For* "cone" *read* "white ball"

Lines 45-46: *Delete and substitute*:—

A light is exhibited at the head of the pier.

Page 224.—Lines 21-22: *Delete* "Weri" to "head" and *substitute* "Toenas Gain village stands on the northern side"

After line 41 insert:—

A small drying reef lies off the eastern side of Toeboeroeasa, about half a mile northward of its eastern extremity.

Line 43: *Add*:—A shoal with a depth of 59 feet (18^m0) over it, the position of which is approximate, was reported, in 1954, to lie about 4 miles west-south-westward of the same point.】

Page 225.—Line 4: *Add*:—A sunken reef, with a depth of 23 feet (7^m0) over its northern end, was reported, in 1950, about 5 miles south-westward of the islet.

Page 226.—Lines 6-7: *Delete* "Derdi" to "of it" and *substitute* "Derdi, an islet covered with vegetation; a similar islet lies close northward of Derdi"

Line 16: *After* "Dangers.—" *insert* "Buoy.—"

Line 18: *For* " $1\frac{1}{4}$ miles" *read* "one mile"

Line 21: *Add*:—A 5-fathom (9^m1) patch lies about 4 cables south-westward of the south-western end of Oerobi.

Line 39: *After* "Oerobi;" *insert* "there are several shoals, with depths of from $3\frac{1}{4}$ to $4\frac{1}{2}$ fathoms (5^m9 to 7^m8) over them, within 3 miles westward and north-north-eastward of the islet;"

Line 42: *For* "A reef" *read* "Simla reef"

Line 43: *After* "mainland" *insert* "and a drying reef about half a mile south-eastward of the islet. A $2\frac{1}{2}$ -fathom (4^m6) patch lies about 3 miles eastward of Oerobi"

Lines 47-50: *Delete* "Two" to "islet." and *substitute*:—

A $4\frac{3}{4}$ -fathom (8^m7) patch lies about 6 cables south-south-eastward of Karawatoe. A $2\frac{3}{4}$ -fathom (5^m0) patch, a $3\frac{1}{4}$ -fathom (5^m9) patch and a rock, with a depth of less than 6 feet (1^m8) over it, lie, respectively, about $3\frac{1}{4}$, $4\frac{1}{2}$ and $6\frac{1}{2}$ miles north eastward of Keliwala; a shoal with a depth of $2\frac{3}{4}$ fathoms (5^m0) over it, lies about $2\frac{1}{2}$ miles northward and a $3\frac{1}{2}$ -fathom (6^m4) patch, marked by a red conical buoy, about 3 miles north-north-eastward of the same islet; a $4\frac{1}{2}$ -fathom (8^m2) patch lies about midway between the latter two shoals.

Line 51: *After* "mainland," *insert* "and northward and westward of Karawatoe,"

Page 227.—Line 43: *After* “Dangers.—” *insert* “Buoys.—”

Page 228.—Lines 4-7: *Delete and substitute*:—

A $3\frac{1}{2}$ -fathom (6^m4) patch, marked by a red conical buoy, lies about 13 miles southward of Tanjong Simora; two rocks, with depths of $2\frac{1}{2}$ and $2\frac{3}{4}$ fathoms (4^m6 and 5^m0) over them, each marked by a red conical buoy, lie about $9\frac{1}{2}$ and $10\frac{1}{2}$ miles south-south-westward and a $6\frac{1}{2}$ -fathom (11^m4) patch about $10\frac{1}{2}$ miles southward of the same point; a $4\frac{3}{4}$ -fathom (8^m7) patch and a 5-fathom (9^m1) patch lie about $3\frac{1}{4}$ and 2 miles southward of Tanjong Simora; foul ground, with depths of from 3 to 4 fathoms (5^m5 to 7^m3) on its outer edge, extends about $1\frac{1}{4}$ miles southward and south-westward of that point. Depths of less than 3 fathoms (5^m5) extend about half a mile westward and south-westward from the northern end of Tanjong Simora.

Line 15: *Add*:—This ridge extends about $6\frac{1}{2}$ miles southward from Serotte islet, and the shoals at its southern end, with depths of from 2 to $3\frac{1}{4}$ fathoms (3^m7 to 6^m4) over them, lie in the entrance to the eastern channel. A red conical buoy is moored within the western edge of these shoals.

Lines 16-22: *Delete and substitute*:—

The western channel should not be used as it is encumbered with reefs and shoals.

From a position about 2 miles northward of Tanjong Simora, for a distance of about 10 miles, the eastern side of the channel is fronted by reefs and foul ground to a distance of about $1\frac{1}{4}$ miles offshore. The eastern side of the entrance to, and of the southern part of, the eastern channel is marked by buoys.

Above Serotte islet the ridge mentioned above is continued north-north-westward, for a distance of about $4\frac{1}{2}$ miles, as a series of shoals and patches with depths of from 3 to 5 fathoms (5^m5 to 9^m1) over them, leaving only a narrow channel between them and the shore bank on either side of the channel.

A 9-foot (2^m7) patch lies off the entrance to Argoeni baai and about 6 miles northward of Serotte islet.

Line 50: *Add*:—It was reported, in 1951, that the reef situated about $4\frac{1}{2}$ cables south-eastward of the southern extremity of Sjiirnoesoe had extended eastward and south-westward.

Page 229.—Line 34: *After* “except” *insert* “a pinnacle rock situated nearly half a cable off the western shore, about half a mile north-westward of Berdaha village;”

Line 50: *After* “baai.—” *insert* “Buoys.—”

Page 230.—Line 4: *Delete* “charted.” to “patch” and *substitute* “charted; a buoy marking the edge of the bank is moored about $1\frac{1}{2}$ miles eastward of Tanjong Simora. A 3-fathom (5^m5) patch”

Line 5: *After* “Simora” *insert* “; a shoal, with a depth of 2 feet (0^m6) over it, lies about $1\frac{1}{2}$ miles east-south-eastward of the same point”

Line 9: *For* “ $2\frac{1}{2}$ -fathom (4^m6)” *read* “ $4\frac{1}{2}$ -fathom (8^m2)”

Line 10: *Add*:—A bank, with a depth of 8 fathoms (14^m6) over it, lies about $1\frac{3}{4}$ miles south-south-eastward of Tanjong Bitsjara.

Line 14: *For* “Beacons.—” *read* “Buoy.—[Light.—]”

Line 18: *For* “three unofficial beacons” *read* “a buoy painted black and white”

Page 230 continued.

Line 24: *Add*:—In 1945, the pier was in ruins.

[A light is exhibited at the root of the pier.]

Lines 25-30: *Delete and substitute*:—

Sheltered anchorage may be obtained, in a depth of 5 fathoms (9^m1), about one cable from the head of the ruined pier.

Lines 38-39: *Delete* "Besan" to "which" and *substitute* "Bitsjara village lies on the eastern shore of the bay about 1½ miles northward of Tanjong Bitsjara. Sisiandang rivier"

Page 231.—[Line 24: *After* "approached." *insert*:—A 6-foot (1^m8) patch lies about half a mile northward of Kowika, an islet situated off the south-western end of Noesoeroemi.]

Line 27: *Add*:—The village of Lobo lies at the head of the bay on the mainland northward of Maoewara.

Lines 32-33: *Delete*.

Lines 34-35: *For* "off Lobo village" *read* "in the north-western corner"

Line 37: *For* "off Lobo" *read* "in the north-western corner of the head of the bay"

Line 53: *After* "uninhabited" *insert* ", except for a village situated about 4½ miles south-eastward of the north-eastern entrance point"

Page 232.—Line 12: *Delete and substitute*:—

"(23^m8), about 8 cables eastward of the north-western extremity of the"

Line 14: *For* "the village" *read* "this anchorage"

Lines 33-34: *Delete*.

Page 233.—Line 4: *After* "Lakahia." *insert* "Buoy.—"

Line 22: *Delete* "half"

Line 24: *For* "1½ fathoms (3^m2)" *read* "1½ fathoms (2^m3)"

Line 30: *After* "north-eastward." *insert* "Two shoals, with depths of 1½ and 2¾ fathoms (3^m2 and 5^m0) over them, lie, respectively, about three-quarters of a mile south-eastward and the same distance eastward of Tanjong Wariwi; the southern of these two shoals is marked by a buoy on its northern side."

After line 32 *insert*:—

There is a village on the northern side of Tanjong Tarella.

Page 234.—Lines 50-54: *Delete* "for Tanjong" to "off Tanjong" and *substitute* "for the southern entrance point of the river about 1¼ miles south-south-eastward of Tanjong Bawia (Lat. 3° 56' S., Long. 134° 40' E.), bearing 066°, crossing a bar, in a depth of about 20 feet (6^m1), between Karang Japbari and the drying shoals on the eastern side of the channel, until Tanjong Bawia bears 040° when she should keep it so; when Tanjong Warwi bears 290°"

Page 235.—Line 2: *Delete* "Tarella" to "when"

Line 31: *Delete and substitute*:—

Chart 3246.

Line 34: *For* "38" *read* "40"

Line 36: *For* "4,567 feet (1392^m0)" *read* "4,334 feet (1321^m0)"

Line 37: *For* "6" *read* "8"

Page 235 continued.

Line 38: For " 5 " read " 14 "

Line 50: For " 4° 14' S., Long. 134° 50' " read " 4° 15' S., Long. 134° 48' "

Line 51: For " rivier, about 10 " read " (Buru) rivier, about 9 "

Line 53: Delete " eastern " to " 8 " and substitute " northern side of the entrance of Petawai rivier, about 9 "

Page 236.—Line 1: Delete and substitute:—

Chart 3246.

Lines 2-3: Delete " midway " to " Namaripi " and substitute " 3 miles east-south-eastward of Petawai rivier "

Line 4: For " 4° 27' S., Long. 135° 10' " read " 4° 28' S., Long. 135° 12' "

After line 5 insert:—

Charts 942b and 3246.

Line 10: For " north-eastward " read " eastward "

After line 24 insert:—

Chart 3246.

Line 30: For " 50 " read " 48 "

Line 31: Delete " Siéra " to " 32 " and substitute " Jera and Paracka, 9, 23 and 31 "

Line 34: For " Siéra and Perogo " read " Jera and Paracka "

Line 38: For " Perogo " read " Paracka "

Line 44: After " Coast.—" insert " Beacon.—"

Line 49: For " 8 " read " 9 "

Page 237.—Line 1: Delete and substitute:—

Chart 3246.

After line 7 insert:—

Chart 942b.

Lines 26, 29, 32 and 35: For " Keaukwa " read " Keakwa "

After line 34 insert:—

In 1951 a large and conspicuous white board stood on the western entrance point of Keakwa rivier.

A beacon, surmounted by a white triangle stands, close south-eastward of Kampong Keakwa, on the coast about half a mile south-eastward of the mouth of Keakwa rivier.

Between the Mimika and Keakwa riviars depths of 5 fathoms (9^m1), or less, extend up to a distance of 2 miles offshore and a shoal, with a depth of 17 feet (5^m2) over it, lies about 2 miles south-westward of the mouth of the Keakwa rivier.

Page 245.—Line 10: For " Køl " read " Køl "

After line 12 insert:—

Off-lying shoal.—A shoal, with a depth of one fathom (1^m8) over it, lies about 6 miles south-eastward of Tanjong Kombies.

After line 46 insert:—

In 1948, the channel in the southern entrance was on the northern side of the bank lying southward of Boembel, and the directions for entry from southward were as follows:—

Steer for a point on Komoran eiland situated about 2 miles southward of Boembel, keeping it bearing about 270°; when Tanjong Kombies is abeam and the eastern coast of Boembel is seen clear of the land alter course gradually, and follow the eastern shore.

Page 249.—Line 4: *For* “**Buoys**” *read* “**Buoy**”

Line 8: *Delete* “buoyed”

Lines 18 and 35: *For* “pier” *read* “lower pier”

After line 18 *insert*:—

A light is exhibited from the head of the pier situated about three-quarters of a mile above the lower pier.

Lines 19-21: *Delete* “A conical” to “bank.”

Lines 22-23: *Delete* [“it’s” to “side” and *substitute* “the leading line”]

Line 28: *Add*:—Lights are occasionally exhibited from the leading beacons.

After line 44 *insert*:—

A pier, about 180 feet (54^m9) in length, with a least depth of 15 feet (4^m6) alongside, is situated about three-quarters of a mile above the lower pier; it is inadvisable to berth on the out-going stream as it sets under the pier, rendering it very difficult to get alongside.

Line 50: *Delete* “090°” to “buoy” and *substitute* “078°”

Line 51: *After* “southward” *insert* “and eastward”

Lines 52-54: *Delete* “044°” to “as the” and *substitute* “about [040°].”

Page 250.—Lines 2-5: *Delete*.

Line 22: *Delete* and *substitute*:—

If ordered in good time, a plentiful supply of meat may be obtained; fresh vegetables, fruit and fish are sometimes available in small quantities.

Page 259.—Index: *For* “Efrocan” *read* “Efroean”

Below “Fet Dom, Tanjong” *insert*:—

Firing danger areas 11

Page 261.—Index: *For* “Harookoe” *read* “Haroekoe”

[Page 263.—Index: *Delete* “Kawassi village 100”]

Page 265.—Index: Kukusan: Page number: *For* “116” *read* “117”

[Page 266.—Index: *Delete* “Lodji village 100”]

[Delete “Loji village 100”]

Page 269.—Index: *For* “Minahara” *read* “Minahasa”

Page 270.—Index: *For* “Nambea” *read* “Namlea”

Page 276.—Index: *For* “Sitjeh” *read* “Sitjek”

NEW AND ALTERED NAMES

The following list gives new names and alterations in old names which will be adopted in all Hydrographic publications affected as opportunity occurs:—

New name	Page of Pilot	Obsolete name
Aer Tembaga village	47	—
Amat Jawah	186	Amat Dawah
Awirisi rocks	195	—
Banda reef	171	—
【Beo	194	—】
Bitung, Kampung	47	—
Bolke, light	207	—
【Danja, Jef	205	Danya, Jef】
Djasi, Tanjong	188	—
Dopior, light	207	—
Egeron reef	223	—
Hajasa, Reede	117	—
Hakoeloeane	117	—
Jaco eiland	173	Jako eiland
【Janboeda	200	—】
Java bank	162	—
Jera rivier	236	Siéra rivier
Kalasoega village	32	Kaloesaga village
Kamoomjel, light	207	—
Karim	207	—
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Keakwa rivier	237	Keaukwa rivier
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【Kowika	231	—】
Latdalam village	188	—
Makmak	208	—
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Manil island	201	—
Moe	207	—
Napoe Arampoea	26	—
Napoe Mapao	28	—
Nip shoal	74	—
Njarigiro, Tanjong	54	—
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Oost-Indische archipel	v	Netherlands East Indies
Paracka rivier	236	Perogo rivier
Pasir Besar	73	—
Sevivara, Ponta	173	Sewirawa, Tanjong

NEW AND ALTERED NAMES—*continued.*

New name	Page of Pilot	Obsolete name
Simla reef	226	—
Steenkool	219	—
【Swingkrai	200	—】
Taudore	104	—
Tawabi village	70	—
Tjaoeraga (Chauraga)	50	—
【Toboko	56	—】
Toember	189	—
Toen	207	—
Toenas Gain village	224	—
Vandoe	207	—
Wanréli, Reede Pantai	177	Wonréli, Reede Pontai
Wanréli rivier	178	Wonréli rivier
【Waronge rivier	213	Warongé rivier】
Wiljam, Kampong	207	—
Wolo Genan	207	—

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